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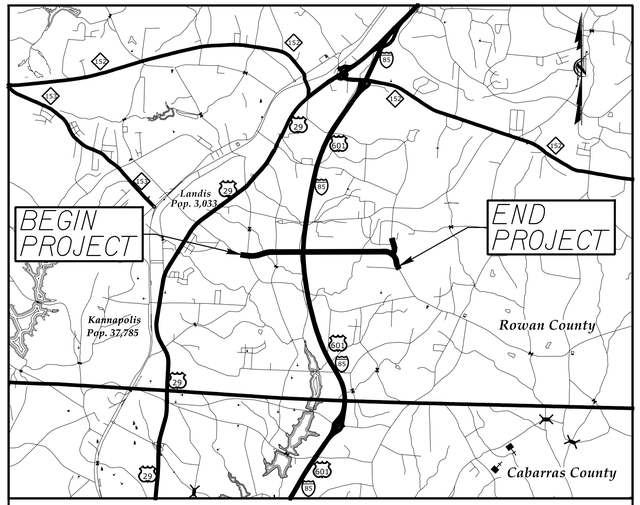
09/08/99

TIP PROJECT: W-5516

CONTRACT: C203652

See Sheet 1A For Index of Sheets
See Sheet 1B For Conventional Symbols



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

ROWAN COUNTY

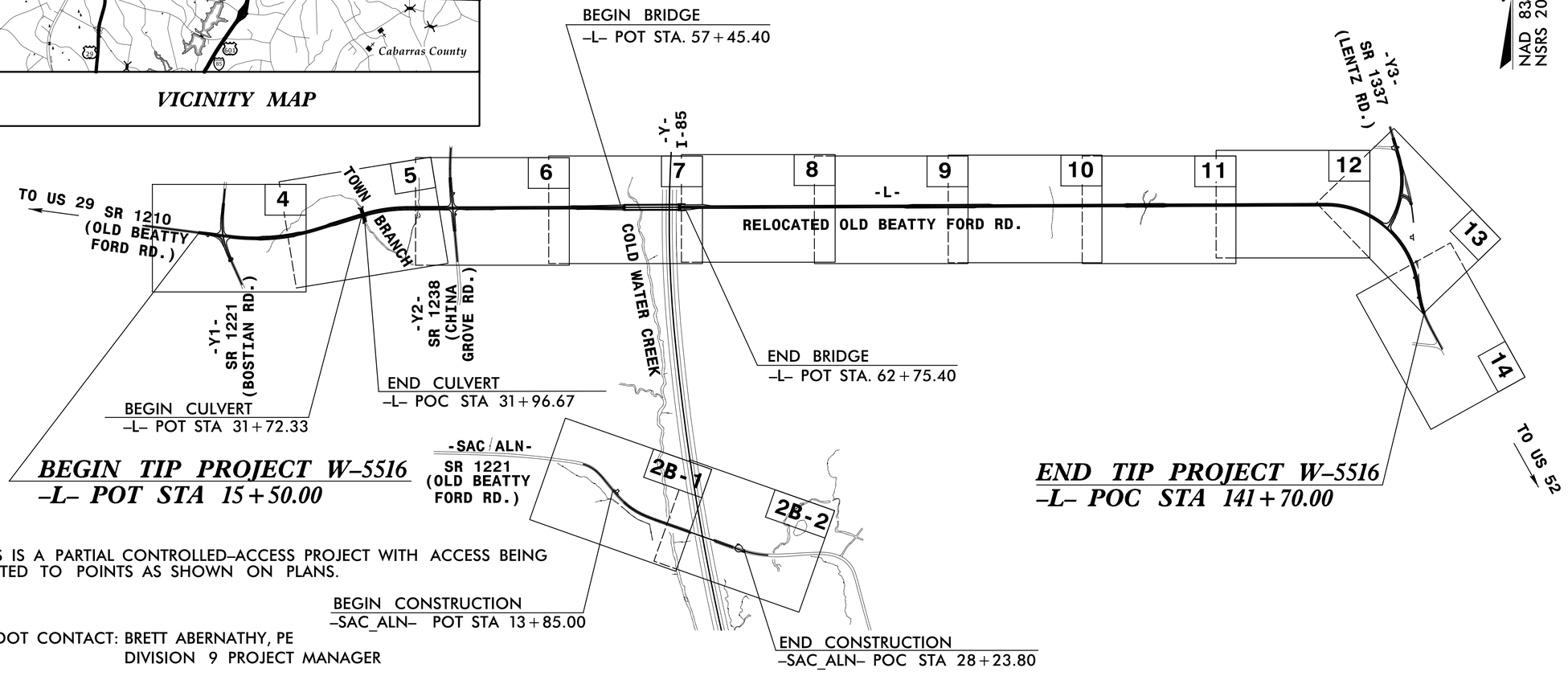
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	W-5516	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
44105.1.FD1	HSIP-1221(18)	PE
44105.2.FD1	HSIP-1221(18)	R/W
44105.3.FD1	HSIP-1221(18)	CONST

LOCATION: SR 1210 (OLD BEATTY FORD ROAD) FROM WEST OF SR 1221 (BOSTIAN ROAD) INTERSECTION TO SR 1337 (LENTZ ROAD)

TYPE OF WORK: GRADING, DRAINAGE, PAVING, STRUCTURES, & CULVERTS.

NAD 83/ NSRS 2007



BEGIN TIP PROJECT W-5516
–L– POT STA 15+50.00

END TIP PROJECT W-5516
–L– POC STA 141+70.00

THIS IS A PARTIAL CONTROLLED-ACCESS PROJECT WITH ACCESS BEING LIMITED TO POINTS AS SHOWN ON PLANS.

BEGIN CONSTRUCTION
–SAC_ALN– POT STA 13+85.00

END CONSTRUCTION
–SAC_ALN– POC STA 28+23.80

NCDOT CONTACT: BRETT ABERNATHY, PE
DIVISION 9 PROJECT MANAGER

GRAPHIC SCALES

PLANS: 50 25 0 50 100

PROFILE (HORIZONTAL): 50 25 0 50 100

PROFILE (VERTICAL): 10 5 0 10 20

DESIGN DATA

ADT (2015) = 2000
ADT (2035) = 3300
DHV = 10 %
D = 65 %
T = 8 % *
V = 50 MPH
* TTST = 3% DUAL = 5%

FUNC CLASS = COLLECTOR
REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT W-5516 = 2.290 MI

LENGTH STRUCTURE TIP PROJECT W-5516 = 0.100 MI

TOTAL LENGTH TIP PROJECT W-5516 = 2.390 MI

Prepared for the North Carolina Department of Transportation In the office of:

ICA Engineering
5121 Kingdom Way, Suite 100
Raleigh, NC 27607
NC License No: P0358

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: SEPTEMBER 16, 2014

LETTING DATE: SEPTEMBER 15, 2015

DAVID C. WALLER, PE
PROJECT ENGINEER

HENRY BARE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 34364 ENGINEER TRENTON J CORMIER

DocuSigned by: Trent Cormier 7/6/2015 *P.E.*
SIGNATURE:

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 22606 ENGINEER DAVID C WALLER

DocuSigned by: David C. Waller 7/6/2015 *P.E.*
SIGNATURE:

STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION •

7/6/2015
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ICA ENGINEERING, INC.

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PROJECT REFERENCE NO.	SHEET NO.
W-5516	1A

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 22606 ENGINEER DAVID C. WALLER

DocuSigned by: David C. Waller 7/6/2015
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INDEX OF SHEETS

SHEET NUMBER	SHEET
1	TITLE SHEET
1A	INDEX OF SHEETS, GENERAL NOTES AND STANDARD DRAWINGS
1B	CONVENTIONAL SYMBOLS
1C-1 THRU 1C-5	SURVEY CONTROL SHEETS
1D-1	CENTERLINE COORDINATE LIST
2A-1 THRU 2A-3	PAVEMENT SCHEDULE AND TYPICAL SECTIONS
2B-1 THRU 2B-3	ROADWAY DETAILS
3B-1	SUMMARY OF EARTHWORK
3B-2	GUARDRAIL SUMMARY
3B-3	ROADWAY SUMMARIES
3D-1 THRU 3D-3	DRAINAGE DETAILS
3G-1	GEOTECHNICAL SUMMARIES
3P-1	PARCEL INDEX SHEET
4 THRU 21	PLAN AND PROFILE SHEETS
TMP-1 THRU TMP-10	TRAFFIC MANAGEMENT PLANS
PMP-1 THRU PMP-5	PAVEMENT MARKING PLANS
EC-1 THRU EC-29	EROSION CONTROL PLANS
SIGN-1 THRU SIGN-5	SIGNING PLANS
UO-1 THRU UO-5	UTILITIES BY OTHERS PLANS
X-1 THRU X-1A	CROSS-SECTION SUMMARY SHEET
X-2 THRU X-101	CROSS-SECTIONS
S-1 THRU S-41	STRUCTURE PLANS
C-1 THRU C-13	CULVERT PLANS
W-1 THRU W-4	WALL PLANS

GENERAL NOTES:

2012 SPECIFICATIONS
EFFECTIVE: 01-17-2012
REVISED: 10-31-2014

GRADING AND SURFACING OR RESURFACING AND WIDENING:

THE GRADE LINES SHOWN DENOTE THE FINISHED ELEVATION OF THE PROPOSED SURFACING AT GRADE POINTS SHOWN ON THE TYPICAL SECTIONS. WHERE NO GRADE LINES ARE SHOWN, THE PROFILES SHOWN DENOTE THE TOP ELEVATION OF THE EXISTING PAVEMENT ALONG THE CENTER LINE OF SURVEY ON WHICH THE PROPOSED RESURFACING WILL BE PLACED. GRADE LINES MAY BE ADJUSTED BY THE ENGINEER IN ORDER TO SECURE A PROPER TIE-IN.

CLEARING:

CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III.

SUPERELEVATION:

ALL CURVES ON THIS PROJECT SHALL BE SUPERELEVATED IN ACCORDANCE WITH STD. NO. 225.04 USING THE RATE OF SUPERELEVATION AND RUNOFF SHOWN ON THE PLANS. SUPERELEVATION IS TO BE REVOLVED ABOUT THE GRADE POINTS SHOWN ON THE TYPICAL SECTIONS.

SHOULDER CONSTRUCTION:

ASPHALT, EARTH, AND CONCRETE SHOULDER CONSTRUCTION ON THE HIGH SIDE OF SUPERELEVATED CURVES SHALL BE IN ACCORDANCE WITH STD. NO. 560.01

SIDE ROADS:

THE CONTRACTOR WILL BE REQUIRED TO DO ALL NECESSARY WORK TO PROVIDE SUITABLE CONNECTIONS WITH ALL ROADS, STREETS, AND DRIVES ENTERING THIS PROJECT. THIS WORK WILL BE PAID FOR AT THE CONTRACT UNIT PRICE FOR THE PARTICULAR ITEMS INVOLVED.

UNDERDRAINS:

UNDERDRAINS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. NO. 815.03 AT LOCATIONS DIRECTED BY THE ENGINEER.

DRIVEWAYS:

DRIVEWAYS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. 848.03 AT LOCATIONS SHOWN ON PLANS OR AS DIRECTED BY THE ENGINEER.

GUARDRAIL:

THE GUARDRAIL LOCATIONS SHOWN ON THE PLANS MAY BE ADJUSTED DURING CONSTRUCTION AS DIRECTED BY THE ENGINEER. THE CONTRACTOR SHOULD CONSULT WITH THE ENGINEER PRIOR TO ORDERING GUARDRAIL MATERIAL.

UTILITIES:

UTILITY OWNERS ON THIS PROJECT ARE Duke Energy, Concord Telephone,

ANY RELOCATION OF EXISTING UTILITIES WILL BE ACCOMPLISHED BY OTHERS.

RIGHT-OF-WAY MARKERS:

ALL RIGHT-OF-WAY MARKERS ON THIS PROJECT SHALL BE PLACED BY CONTRACT.

EFF. 01-17-2012
REV. 10-30-2012

2012 ROADWAY ENGLISH STANDARD DRAWINGS

The following Roadway Standards as appear in "Roadway Standard Drawings" Highway Design Branch - N. C. Department of Transportation - Raleigh, N. C., Dated January, 2012 are applicable to this project and by reference hereby are considered a part of these plans:

STD.NO.	TITLE
DIVISION 2 - EARTHWORK	
200.03	Method of Clearing - Method III
225.02	Guide for Grading Subgrade - Secondary and Local
225.04	Method of Obtaining Superelevation - Two Lane Pavement
225.06	Method of Grading Sight Distance at Intersections
DIVISION 3 - PIPE CULVERTS	
300.01	Method of Pipe Installation
310.10	Driveway Pipe Construction
DIVISION 4 - MAJOR STRUCTURES	
422.10	Reinforced Bridge Approach Fills
DIVISION 5 - SUBGRADE, BASES AND SHOULDERS	
560.01	Method of Shoulder Construction - High Side of Superelevated Curve - Method I
DIVISION 6 - ASPHALT BASES AND PAVEMENTS	
654.01	Pavement Repairs
DIVISION 8 - INCIDENTALS	
806.01	Concrete Right-of-Way Marker
806.02	Granite Right-of-Way Marker
815.03	Pipe Underdrain and Blind Drain
838.01	Concrete Endwall for Single and Double Pipe Culverts - 15" thru 48" Pipe 90 Skew
838.11	Brick Endwall for Single and Double Pipe Culverts - 15" thru 48" Pipe 90 Skew
838.39	Reinforced Concrete Endwall - for Single 72" Pipe 90 Skew
838.45	Notes for Reinforced Concrete Endwall - Std. Dwg 838.21 thru 838.40
838.69	Reinforced Brick Endwall - for Single 72" Pipe 90 Skew
838.75	Notes for Reinforced Brick Endwall - Std. Dwg 838.51 thru 838.70
838.80	Precast Endwalls - 12" thru 72" Pipe 90 Skew
840.18	Concrete Grated Drop Inlet Type 'B' - 12" thru 36" Pipe
840.24	Frames and Narrow Slot Sag Grates
840.27	Brick Grated Drop Inlet Type 'B' - 12" thru 36" Pipe
840.29	Frames and Narrow Slot Flat Grates
840.31	Concrete Junction Box - 12" thru 66" Pipe
840.32	Brick Junction Box - 12" thru 66" Pipe
840.54	Manhole Frame and Cover
862.01	Guardrail Placement
862.02	Guardrail Installation
862.04	Anchoring End of Guardrail - B-77 and B-83 Anchor Units
866.02	Woven Wire Fence - with Wood Post
876.01	Rip Rap in Channels
876.02	Guide for Rip Rap at Pipe Outlets
876.04	Drainage Ditches with Class 'B' Rip Rap

8/17/99

7/6/2015
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04/16/11

PROJECT REFERENCE NO.	SHEET NO.
W-5516	1B

Note: Not to Scale

****S.U.E. = Subsurface Utility Engineering***

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

BOUNDARIES AND PROPERTY:

- State Line
- County Line
- Township Line
- City Line
- Reservation Line
- Property Line
- Existing Iron Pin — EIP
- Property Corner
- Property Monument — ECM
- Parcel/Sequence Number — 123
- Existing Fence Line
- Proposed Woven Wire Fence
- Proposed Chain Link Fence
- Proposed Barbed Wire Fence
- Existing Wetland Boundary — WLB
- Proposed Wetland Boundary — WLB
- Existing Endangered Animal Boundary — EAB
- Existing Endangered Plant Boundary — EPB
- Known Soil Contamination: Area or Site
- Potential Soil Contamination: Area or Site

BUILDINGS AND OTHER CULTURE:

- Gas Pump Vent or U/G Tank Cap
- Sign — S
- Well — W
- Small Mine
- Foundation
- Area Outline
- Cemetery
- Building
- School
- Church
- Dam

HYDROLOGY:

- Stream or Body of Water
- Hydro, Pool or Reservoir
- Jurisdictional Stream — JS
- Buffer Zone 1 — BZ 1
- Buffer Zone 2 — BZ 2
- Flow Arrow
- Disappearing Stream
- Spring
- Wetland
- Proposed Lateral, Tail, Head Ditch — FLOW
- False Sump

RAILROADS:

- Standard Gauge — CSX TRANSPORTATION
- RR Signal Milepost — MILEPOST 35
- Switch — SWITCH
- RR Abandoned
- RR Dismantled

RIGHT OF WAY:

- Baseline Control Point
- Existing Right of Way Marker
- Existing Right of Way Line
- Proposed Right of Way Line — RW
- Proposed Right of Way Line with Iron Pin and Cap Marker — RW
- Proposed Right of Way Line with Concrete or Granite R/W Marker — RW
- Proposed Control of Access Line with Concrete C/A Marker — CA
- Existing Control of Access — CA
- Proposed Control of Access — CA
- Existing Easement Line — E
- Proposed Temporary Construction Easement — E
- Proposed Temporary Drainage Easement — TDE
- Proposed Permanent Drainage Easement — PDE
- Proposed Permanent Drainage / Utility Easement — DUE
- Proposed Permanent Utility Easement — PUE
- Proposed Temporary Utility Easement — TUE
- Proposed Aerial Utility Easement — AUE
- Proposed Permanent Easement with Iron Pin and Cap Marker

ROADS AND RELATED FEATURES:

- Existing Edge of Pavement
- Existing Curb
- Proposed Slope Stakes Cut — C
- Proposed Slope Stakes Fill — F
- Proposed Curb Ramp — CR
- Existing Metal Guardrail
- Proposed Guardrail
- Existing Cable Guiderail
- Proposed Cable Guiderail
- Equality Symbol
- Pavement Removal

VEGETATION:

- Single Tree
- Single Shrub
- Hedge
- Woods Line
- Orchard
- Vineyard — Vineyard

EXISTING STRUCTURES:

MAJOR:

- Bridge, Tunnel or Box Culvert — CONC
- Bridge Wing Wall, Head Wall and End Wall — CONC WW

MINOR:

- Head and End Wall — CONC HW
- Pipe Culvert
- Footbridge
- Drainage Box: Catch Basin, DI or JB — CB
- Paved Ditch Gutter
- Storm Sewer Manhole — S
- Storm Sewer — S

UTILITIES:

POWER:

- Existing Power Pole
- Proposed Power Pole
- Existing Joint Use Pole
- Proposed Joint Use Pole
- Power Manhole — P
- Power Line Tower
- Power Transformer
- U/G Power Cable Hand Hole
- H–Frame Pole
- Recorded U/G Power Line — P
- Designated U/G Power Line (S.U.E.*) — P

TELEPHONE:

- Existing Telephone Pole
- Proposed Telephone Pole
- Telephone Manhole — T
- Telephone Booth
- Telephone Pedestal — T
- Telephone Cell Tower
- U/G Telephone Cable Hand Hole — HH
- Recorded U/G Telephone Cable — T
- Designated U/G Telephone Cable (S.U.E.*) — T
- Recorded U/G Telephone Conduit — TC
- Designated U/G Telephone Conduit (S.U.E.*) — TC
- Recorded U/G Fiber Optics Cable — T FO
- Designated U/G Fiber Optics Cable (S.U.E.*) — T FO

WATER:

- Water Manhole — W
- Water Meter
- Water Valve
- Water Hydrant
- Recorded U/G Water Line — W
- Designated U/G Water Line (S.U.E.*) — W
- Above Ground Water Line — A/G Water

TV:

- TV Satellite Dish
- TV Pedestal — C
- TV Tower
- U/G TV Cable Hand Hole — HH
- Recorded U/G TV Cable — TV
- Designated U/G TV Cable (S.U.E.*) — TV
- Recorded U/G Fiber Optic Cable — TV FO
- Designated U/G Fiber Optic Cable (S.U.E.*) — TV FO

GAS:

- Gas Valve
- Gas Meter
- Recorded U/G Gas Line — G
- Designated U/G Gas Line (S.U.E.*) — G
- Above Ground Gas Line — A/G Gas

SANITARY SEWER:

- Sanitary Sewer Manhole
- Sanitary Sewer Cleanout
- U/G Sanitary Sewer Line — SS
- Above Ground Sanitary Sewer — A/G Sanitary Sewer
- Recorded SS Forced Main Line — FSS
- Designated SS Forced Main Line (S.U.E.*) — FSS

MISCELLANEOUS:

- Utility Pole
- Utility Pole with Base
- Utility Located Object
- Utility Traffic Signal Box — S
- Utility Unknown U/G Line — ?UTL
- U/G Tank; Water, Gas, Oil
- Underground Storage Tank, Approx. Loc. — UST
- A/G Tank; Water, Gas, Oil
- Geoenvironmental Boring
- U/G Test Hole (S.U.E.*)
- Abandoned According to Utility Records — AATUR
- End of Information — E.O.I.

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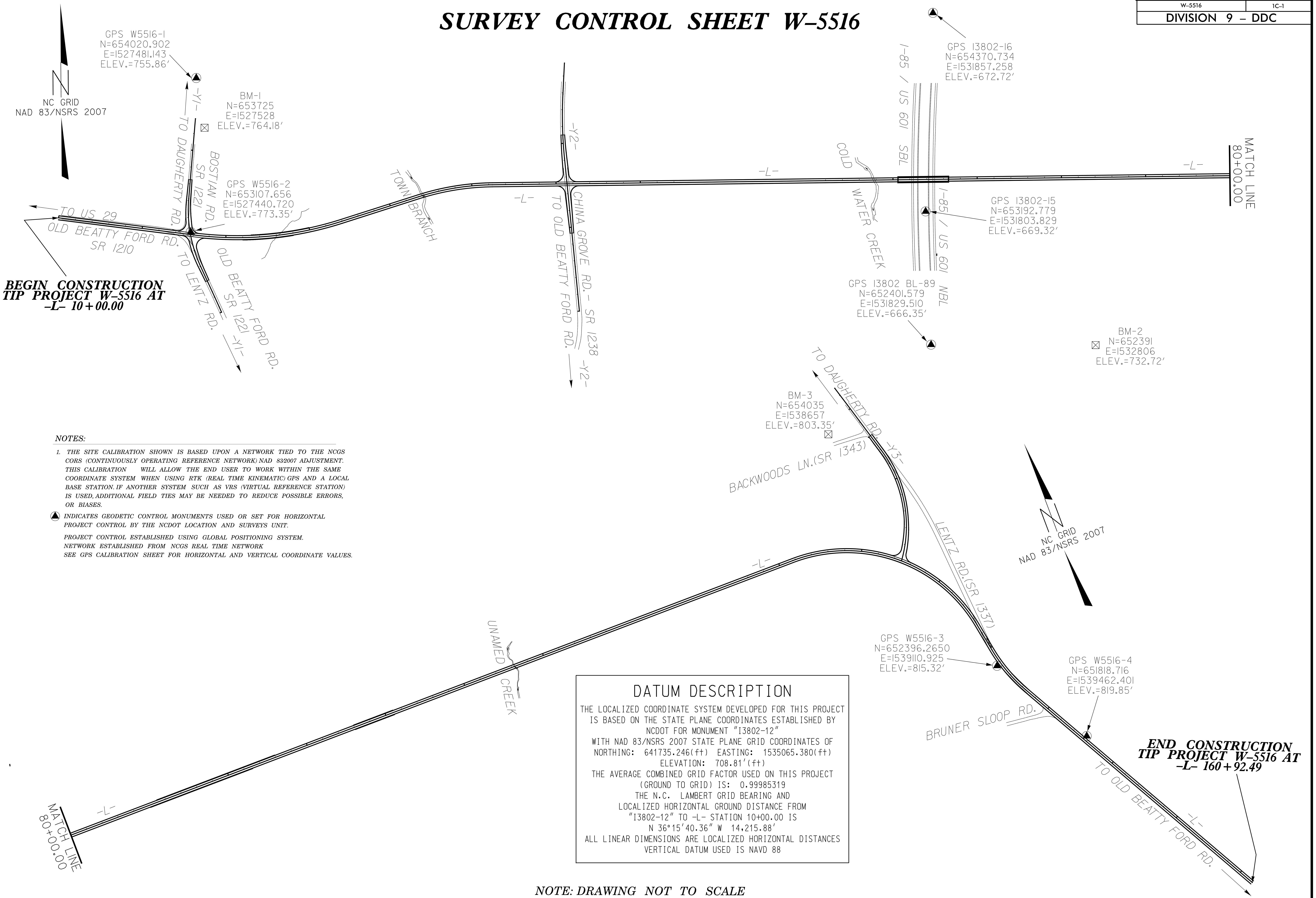
PROJECT REFERENCE NO.	SHEET NO.
W-5516	1C-1
DIVISION 9 - DDC	

SURVEY CONTROL SHEET W-5516



NOTES:

1. *THE SITE CALIBRATION SHOWN IS BASED UPON A NETWORK TIED TO THE NCGS CORS (CONTINUOUSLY OPERATING REFERENCE NETWORK) NAD 83/2007 ADJUSTMENT. THIS CALIBRATION WILL ALLOW THE END USER TO WORK WITHIN THE SAME COORDINATE SYSTEM WHEN USING RTK (REAL TIME KINEMATIC) GPS AND A LOCAL BASE STATION. IF ANOTHER SYSTEM SUCH AS VRS (VIRTUAL REFERENCE STATION) IS USED, ADDITIONAL FIELD TIES MAY BE NEEDED TO REDUCE POSSIBLE ERRORS, OR BIASES.*

▲ *INDICATES GEODETIC CONTROL MONUMENTS USED OR SET FOR HORIZONTAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT.*

PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.
NETWORK ESTABLISHED FROM NCGS REAL TIME NETWORK
SEE GPS CALIBRATION SHEET FOR HORIZONTAL AND VERTICAL COORDINATE VALUES.

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "I3802-12"
WITH NAD 83/NSRS 2007 STATE PLANE GRID COORDINATES OF
NORTHING: 641735.246(ft) EASTING: 1535065.380(ft)
ELEVATION: 708.81'(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99985319
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "I3802-12" TO -L- STATION 10+00.00 IS
N 36°15'40.36" W 14,215.88'
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

NOTE: DRAWING NOT TO SCALE

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PROJECT REFERENCE NO.	SHEET NO.
W-5516	1C-2
DIVISION 9 – DDC	

SURVEY CONTROL SHEET W-5516

DESIGN ALIGNMENTS

L

TYPE	STATION	NORTH	EAST
POT	10+00.00	653203.6797	1526655.4020
PC	18+50.42	653095.6213	1527498.9296
PT	27+24.22	653170.7579	1528362.8047
PC	31+76.60	653304.8458	1528794.8589
PT	36+22.08	653372.2400	1529233.5521
PC	125+84.38	653407.5639	1538195.7789
PT	138+42.17	652666.2107	1539085.2344
PC	140+14.21	652496.8649	1539115.5592
PCC	142+10.45	652309.5281	1539172.4820
PT	143+77.20	652159.6873	1539245.5396
POT	145+61.23	651997.7060	1539332.8819

Y1

TYPE	STATION	NORTH	EAST
POT	10+00.00	653557.7645	1527453.1995
PC	12+53.30	653305.5552	1527429.7282
PT	16+66.31	652902.6830	1527496.9521
POT	19+65.72	652629.7224	1527619.9872

Y3

TYPE	STATION	NORTH	EAST
PC	10+00.00	654165.4451	1538823.8655
PT	11+39.59	654031.4709	1538863.0672
PC	13+01.82	653875.6319	1538908.1519
PT	20+30.15	653178.7983	1538798.8708

Y

TYPE	STATION	NORTH	EAST
POT	17+86.28	656005.7918	1532054.5187
PC	19+83.74	655810.3561	1532026.2902
PCC	31+79.94	654624.3373	1531870.7970
PCC	57+36.20	652073.2127	1531849.1728
PCC	77+64.45	650065.6055	1532133.9209
PT	103+60.52	647545.5996	1532751.4591

Y2

TYPE	STATION	NORTH	EAST
PC	10+00.00	653958.7400	1529659.3777
PCC	11+96.51	653762.3845	1529652.0723
PT	14+05.90	653553.2479	1529660.2712
PC	16+91.59	653268.7574	1529686.3841
PT	17+79.63	653181.0737	1529694.2982
POT	21+08.01	652853.9829	1529723.3201

Y3A

TYPE	STATION	NORTH	EAST
POT	10+00.00	653496.3271	1538927.7469
PC	10+22.86	653492.2714	1538950.2409
PCC	11+44.95	653410.9180	1539031.0309
PT	13+19.26	653238.0487	1539052.8525

DATUM DESCRIPTION

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NOTES:

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▲ *INDICATES GEODETIC CONTROL MONUMENTS USED OR SET FOR HORIZONTAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT.*

PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.
NETWORK ESTABLISHED FROM NCGS REAL TIME NETWORK
SEE GPS CALIBRATION SHEET FOR HORIZONTAL AND VERTICAL COORDINATE VALUES.

5/14/99
6/25/2015

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SURVEY CONTROL SHEET W–5516

ROW MARKER CONCRETE OR GRANITE-E

ALIGN	STATION	OFFSET	NORTH	EAST
L	15+50.00	-24.88	653158.4691	1527204.1049
L	17+00.00	-45.00	653159.3697	1527355.4461
L	18+50.42	-55.00	653150.1756	1527505.9175
L	18+90.00	45.00	653046.2356	1527533.3835
L	21+00.00	40.00	653039.1127	1527747.6037
L	21+05.00	-40.00	653119.0928	1527752.9109
L	21+50.00	55.00	653024.4820	1527798.8731
L	22+65.00	65.00	653020.1330	1527917.5815
L	24+00.00	-70.00	653168.9121	1528036.9278
L	24+75.00	30.00	653082.0706	1528126.2015
L	24+85.00	-60.00	653172.3856	1528119.7458
L	25+65.00	-30.00	653158.8013	1528202.4205
L	27+24.22	30.00	653142.1060	1528371.6968
L	27+24.22	-30.00	653199.4098	1528353.9126
L	28+45.00	30.00	653177.9051	1528487.0476
L	29+50.00	-30.00	653266.3313	1528569.5450
L	30+00.00	60.00	653195.1958	1528643.9745
L	31+45.00	-115.00	653405.3103	1528730.5880
L	31+50.00	135.00	653168.0266	1528809.4642
L	32+05.00	-120.00	653428.2654	1528788.6635
L	34+65.00	30.00	653333.5818	1529080.0463
L	34+65.00	-30.00	653393.2280	1529073.5395
L	35+70.00	-30.00	653401.1083	1529180.3272
L	36+00.00	30.00	653341.9957	1529212.0337
L	37+10.00	100.00	653272.5873	1529321.8658
L	37+14.00	-90.00	653462.6016	1529325.1169
L	39+35.00	40.00	653333.4736	1529546.6276
L	39+40.00	-40.00	653413.4927	1529551.3122
L	40+00.00	50.00	653323.7299	1529611.6665
L	40+00.00	-45.00	653418.7292	1529611.2920
L	41+30.00	-50.00	653424.2415	1529741.2713
L	41+50.00	45.00	653329.3211	1529761.6456
L	43+00.00	38.00	653336.9122	1529911.6168
L	43+45.00	55.00	653320.0897	1529956.6835
L	43+75.00	-60.00	653435.2071	1529986.2300
L	43+75.00	55.00	653320.2080	1529986.6833
L	44+75.00	30.00	653345.6019	1530086.5840
L	46+00.00	-30.00	653406.0941	1530211.3465
L	50+50.00	30.00	653347.8682	1530661.5795
L	51+40.00	-30.00	653408.2225	1530751.3423
L	56+00.00	110.00	653270.0366	1531211.8906
L	56+60.00	-120.00	653500.2713	1531270.9835
L	58+95.00	140.00	653241.1996	1531507.0065
L	59+10.00	110.00	653271.2584	1531521.8881
L	60+31.91	110.00	653271.7389	1531643.7937
L	60+35.43	-120.00	653501.7510	1531646.4067
L	63+86.15	75.00	653308.1349	1531997.8948
L	64+05.02	-75.00	653458.2081	1532016.1783
L	68+00.00	75.00	653309.7660	1532411.7433
L	68+00.00	-75.00	653459.7648	1532411.1521
L	73+00.00	-30.00	653416.7359	1532911.3256

ROW MARKER CONCRETE OR GRANITE-E

ALIGN	STATION	OFFSET	NORTH	EAST
L	73+00.00	30.00	653356.7364	1532911.5620
L	77+10.00	30.00	653358.3523	1533321.5589
L	77+20.00	-30.00	653418.3913	1533331.3223
L	79+15.00	75.00	653314.1607	1533526.7346
L	79+15.00	-75.00	653464.1595	1533526.1434
L	79+45.00	-75.00	653464.2777	1533556.1432
L	79+45.00	75.00	653314.2789	1533556.7344
L	81+90.00	-30.00	653420.2437	1533801.3186
L	82+00.00	30.00	653360.2836	1533811.5551
L	82+62.00	-30.00	653420.5275	1533873.3181
L	82+90.00	30.00	653360.6383	1533901.5543
L	83+35.00	40.00	653350.8158	1533946.5934
L	84+00.00	-70.00	653461.0711	1534011.1593
L	84+75.00	30.00	653361.3675	1534086.5529
L	85+10.00	-30.00	653421.5050	1534121.3161
L	85+65.00	-30.00	653421.7218	1534176.3157
L	87+50.00	-85.00	653477.4505	1534361.0975
L	87+50.00	75.00	653317.4517	1534361.7281
L	88+50.00	45.00	653347.8456	1534461.6091
L	89+45.00	100.00	653293.2205	1534556.8251
L	90+00.00	80.00	653313.4371	1534611.7459
L	90+15.00	-85.00	653478.4950	1534626.0954
L	90+50.00	85.00	653308.6342	1534661.7652
L	91+65.00	-65.00	653459.0863	1534776.1731
L	92+50.00	75.00	653319.4224	1534861.7242
L	92+65.00	-80.00	653474.4803	1534876.1132
L	94+05.00	40.00	653355.0331	1535016.5851
L	94+75.00	-35.00	653430.3084	1535086.2889
L	96+10.00	-60.00	653455.8403	1535221.1893
L	96+53.00	70.00	653326.0108	1535264.7014
L	98+00.00	-35.00	653431.5893	1535411.2864
L	98+00.00	35.00	653361.5899	1535411.5623
L	99+04.00	75.00	653322.0001	1535515.7191
L	99+30.00	-65.00	653462.1015	1535541.1671
L	102+45.00	-30.00	653428.3433	1535856.3026
L	102+50.00	30.00	653368.3635	1535861.5391
L	105+00.00	30.00	653369.3488	1536111.5372
L	105+00.00	-30.00	653429.3484	1536111.3007
L	106+30.00	-55.00	653454.8605	1536241.2011
L	107+90.00	-70.00	653470.4911	1536401.1408
L	108+00.00	70.00	653330.5316	1536411.6925
L	109+50.00	70.00	653331.1228	1536561.6913
L	110+10.00	-70.00	653471.3582	1536621.1391
L	111+00.00	30.00	653371.7137	1536711.5325
L	112+00.00	-30.00	653432.1073	1536811.2953
L	118+50.00	30.00	653374.6697	1537461.5267
L	118+50.00	-30.00	653434.6692	1537461.2902
L	122+45.00	30.00	653376.2266	1537856.5236
L	123+90.00	-30.00	653436.7976	1538001.2860
L	124+05.00	-50.00	653456.8566	1538016.2070
L	124+05.00	40.00	653366.8573	1538016.5618

ROW MARKER CONCRETE OR GRANITE-E

ALIGN	STATION	OFFSET	NORTH	EAST
L	124+45.00	-30.00	653437.0144	1538056.2856
L	125+84.38	-30.00	653437.5637	1538195.6606
L	126+50.00	30.00	653375.5023	1538259.2859
L	127+50.00	-30.00	653422.5314	1538365.9015
L	128+00.00	-40.00	653421.5940	1538418.7841
L	128+50.00	30.00	653340.9449	1538449.1016
L	129+40.00	45.00	653297.9788	1538525.3329
L	129+65.00	-45.00	653370.8349	1538583.7742
L	130+85.00	30.00	653248.2161	1538655.7741
L	137+00.00	30.00	652793.7280	1539020.9186
L	137+45.00	40.00	652749.4948	1539024.5975
L	138+42.17	30.00	652660.9227	1539055.7041
L	140+14.21	29.12	652491.7319	1539086.8945

ROW MARKER CONCRETE OR GRANITE-E

ALIGN	STATION	OFFSET	NORTH	EAST
Y1	13+00.00	-29.19	653257.9508	1527455.9349
Y1	13+80.21	39.90	653176.1634	1527388.2019
Y1	13+80.21	-30.00	653180.7628	1527457.9548
Y1	15+60.00	-30.00	653010.8137	1527488.5665
Y1	16+25.00	-23.47	652949.2939	1527502.8181

ROW MARKER CONCRETE OR GRANITE-E

ALIGN	STATION	OFFSET	NORTH	EAST
Y2	15+05.00	-30.10	653457.3174	1529699.3058
Y2	15+18.97	29.92	653437.9144	1529640.8100
Y2	16+52.86	30.15	653304.5680	1529652.8158
Y2	16+65.00	-29.82	653297.9617	1529713.6533

ROW MARKER CONCRETE OR GRANITE-E

ALIGN	STATION	OFFSET	NORTH	EAST
Y3	13+01.82	29.98	653867.2996	1538879.3504
Y3	13+50.00	30.00	653822.3326	1538890.9436
Y3	18+50.00	30.00	653348.9259	1538854.7320

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "I3802-12"
WITH NAD 83/NSRS 2007 STATE PLANE GRID COORDINATES OF NORTHING: 641735.246(ft) EASTING: 1535065.380(ft)
ELEVATION: 708.81'(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99985319
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "I3802-12" TO -L- STATION 10+00.00 IS
N 36°15'40.36" W 14,215.88'
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

NOTES:

1. THE SITE CALIBRATION SHOWN IS BASED UPON A NETWORK TIED TO THE NCGS CORS (CONTINUOUSLY OPERATING REFERENCE NETWORK) NAD 83/2007 ADJUSTMENT. THIS CALIBRATION WILL ALLOW THE END USER TO WORKWITHIN THE SAME COORDINATE SYSTEM WHEN USING RTK (REAL TIME KINEMATIC) GPS AND A LOCAL BASE STATION. IF ANOTHER SYSTEM SUCH AS VRS (VIRTUAL REFERENCE STATION) IS USED, ADDITIONAL FIELD TIES MAY BE NEEDED TO REDUCE POSSIBLE ERRORS, OR BIASES.

▲ INDICATES GEODETIC CONTROL MONUMENTS USED OR SET FOR HORIZONTAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT.

PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.
NETWORK ESTABLISHED FROM NCGS REAL TIME NETWORK
SEE GPS CALIBRATION SHEET FOR HORIZONTAL AND VERTICAL COORDINATE VALUES.

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5/14/99

PROJECT REFERENCE NO.	SHEET NO.
W-5516	1C-4
DIVISION 9 – DDC	

SURVEY CONTROL SHEET W–5516

GPS Calibration Report

Project : W5516_Calibration

TIP Number: W-5516
User name jkeaton
Date & Time 2:59:16 PM 7/25/2014
Coordinate System US State Plane 1983
Zone North Carolina 3200
Horizontal Datum NAD 1983 (Conus)
Vertical Datum Geoid Model Geoid12
(Conus) NC Sub Grid
Coordinate Units US survey feet
Distance Units US survey feet
Height Units US survey feet

LOCAL SITE INFORMATION

Localized around 13802-12
Latitude: N 35°30′11.61315"
Longitude: W 80°33′44.04363"
Ground scale factor: 1.0001468314
Height: 607.596 ft

The North Carolina Department of Transportation uses a Localized Coordinate System which is very similar to North Carolina Zone 3200 from which it is derived. Please take care in utilizing these coordinates to eliminate confusion of the two systems. This file is to aid in the use of Real Time Kinematic (RTK) GPS during construction layout.

Datum Transformation Parameters

Datum Transformation computation not requested

Updated Default Projection (Transverse Mercator) Definition

Updated default projection not requested

Horizontal Calibration Parameters

Translation north: 1.672 ft
Translation east: -0.348 ft
Rotation: 0°00′01"
Origin northing: 653149.503 ft
Origin easting: 1532859.727 ft
Scale factor: 1.0001507021

Vertical Calibration Parameters

Vertical shift at origin: -0.210 ft
Slope north: -35.799 ppm
Slope east: -9.749 ppm
Origin northing: 652396.266 ft
Origin easting: 1539110.910 ft

Geoid Model Definition

Geoid12 (Conus) NC Sub Grid

Residual Differences Between GPS

and Local Coordinates
Summary

	Maximum error	Root Mean Square error	Point
Horizontal	0.092 ft	0.056 ft	GPS_15
Vertical	-0.038 ft	0.029 ft	GPS_3
Three-dimensional	0.065 ft	0.054 ft	GPS_2

POINT RESIDUALS

WGS84 Coordinates	Calculated point (for display only)	Local Coordinates
Point GPS_3 Latitude N35°31′57.66035" Longitude W80°32′57.13443" Height 714.134 ft	Point GPS_3 Northing 652396.266 ft Easting 1539110.910 ft Elevation 815.282 ft Horiz. residual 0.015 ft Vert. residual -0.038 ft 3D residual 0.041 ft	Point 3 Northing 652396.265 ft Easting 1539110.925 ft Elevation 815.320 ft Type Horz and Vert
Point GPS_1 Latitude N35°32′11.90743" Longitude W80°35′18.13398" Height 654.403 ft	Point GPS_1 Northing 654020.910 ft Easting 1527481.107 ft Elevation 755.887 ft Horiz. residual 0.037 ft Vert. residual 0.027 ft 3D residual 0.045 ft	Point 1 Northing 654020.902 ft Easting 1527481.143 ft Elevation 755.860 ft Type Horz and Vert
Point GPS_4 Latitude N35°31′52.00384" Longitude W80°32′52.77384" Height 718.741 ft	Point GPS_4 Northing 651818.740 ft Easting 1539462.371 ft Elevation 819.888 ft Horiz. residual 0.039 ft Vert. residual 0.038 ft 3D residual 0.054 ft	Point 4 Northing 651818.716 ft Easting 1539462.401 ft Elevation 819.850 ft Type Horz and Vert
Point GPS_2 Latitude N35°32′02.87074" Longitude W80°35′18.44644" Height 671.829 ft	Point GPS_2 Northing 653107.673 ft Easting 1527440.662 ft Elevation 773.326 ft Horiz. residual 0.060 ft Vert. residual -0.024 ft 3D residual 0.065 ft	Point 2 Northing 653107.656 ft Easting 1527440.720 ft Elevation 773.350 ft Type Horz and Vert
Point GPS_i16 Latitude N35°32′16.05559" Longitude W80°34′25.25977" Height 571.367 ft	Point GPS_i16 Northing 654370.699 ft Easting 1531857.306 ft Elevation 672.718 ft Horiz. residual 0.059 ft Vert. residual -0.002 ft 3D residual 0.060 ft	Point i16 Northing 654370.734 ft Easting 1531857.258 ft Elevation 672.720 ft Type Horz and Vert
Point GPS_i15 Latitude N35°32′04.39951" Longitude W80°34′25.67965" Height 567.860 ft	Point GPS_i15 Northing 653192.764 ft Easting 1531803.919 ft Elevation 669.229 ft Horiz. residual 0.092 ft Vert. residual ? 3D residual ?	Point i15 Northing 653192.779 ft Easting 1531803.829 ft Elevation 669.320 ft Type Horizontal

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "I3802-12"
WITH NAD 83/NSRS 2007 STATE PLANE GRID COORDINATES OF
NORTHING: 641735.246(ft) EASTING: 1535065.380(ft)
ELEVATION: 708.81′(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99985319
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "I3802-12" TO -L- STATION 10+00.00 IS
N 36°15′40.36″ W 14,215.88′
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

NOTES:

1. *THE SITE CALIBRATION SHOWN IS BASED UPON A NETWORK TIED TO THE NCGS CORS (CONTINUOUSLY OPERATING REFERENCE NETWORK) NAD 83/2007 ADJUSTMENT. THIS CALIBRATION WILL ALLOW THE END USER TO WORKWITHIN THE SAME COORDINATE SYSTEM WHEN USING RTK (REAL TIME KINEMATIC) GPS AND A LOCAL BASE STATION. IF ANOTHER SYSTEM SUCH AS VRS (VIRTUAL REFERENCE STATION) IS USED, ADDITIONAL FIELD TIES MAY BE NEEDED TO REDUCE POSSIBLE ERRORS, OR BIASES.*

▲ *INDICATES GEODETIC CONTROL MONUMENTS USED OR SET FOR HORIZONTAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT.*

PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.
NETWORK ESTABLISHED FROM NCGS REAL TIME NETWORK
SEE GPS CALIBRATION SHEET FOR HORIZONTAL AND VERTICAL COORDINATE VALUES.

6/25/2015
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SURVEY CONTROL SHEET W-5516

BL

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
2	W5516-2	653107.6560	1527440.7200	773.35	17+88.60	15.59 LT
10	BL-10	652921.9650	1527777.9630	767.05	21+25.82	149.57 RT
11	BL-11	652993.4880	1528247.0490	759.88	25+69.73	139.24 RT
12	BL-12	653035.1640	1528563.7050	742.53	28+75.90	189.05 RT
13	BL-13	653085.9080	1528919.5640	693.91	32+41.41	244.89 RT
14	BL-14	653016.9460	1529202.1860	696.49	35+79.16	354.70 RT
15	BL-15	652948.2010	1529561.2140	728.31	39+48.07	425.33 RT
16	BL-16	653028.7340	1530078.7830	728.88	44+65.95	346.83 RT
17	BL-17	652989.7800	1530628.4450	718.30	50+15.45	387.95 RT
18	BL-18	652983.3140	1531133.5240	694.70	55+20.50	396.41 RT
19	BL-19	653099.3760	1531513.1050	661.74	59+00.54	281.85 RT
I15	I3802-15	653192.7790	1531803.8290	669.32	61+91.63	189.59 RT
20	BL-20	653118.3820	1531945.6920	699.96	63+33.20	264.55 RT
21	BL-21	653081.3140	1532310.1470	728.32	66+97.50	303.05 RT
22	BL-22	653096.6230	1532585.2140	737.13	69+72.63	288.83 RT
23	BL-23	653103.5090	1533075.4970	752.05	74+62.94	283.87 RT
24	BL-24	653097.4480	1533498.3000	793.69	78+85.71	291.60 RT
25	BL-25	653066.4040	1533816.6490	794.30	82+03.94	323.90 RT
26	BL-26	653101.0030	1534316.4370	801.96	87+03.86	291.27 RT
27	BL-27	653102.9380	1534572.2230	794.80	89+59.65	290.34 RT
28	BL-28	653111.5310	1535070.5520	796.92	94+58.01	283.71 RT
29	BL-29	653112.7990	1535474.3400	751.04	98+61.80	284.04 RT
30	BL-30	653114.9310	1535864.0360	765.88	102+51.50	283.44 RT
31	BL-31	653115.3570	1536142.4240	761.93	105+29.89	284.11 RT
32	BL-32	653114.8290	1536443.1380	744.48	108+30.60	285.82 RT
33	BL-33	653126.1570	1536709.1140	767.59	110+96.61	275.55 RT
34	BL-34	653144.9560	1537193.4380	785.86	115+81.01	258.66 RT
35	BL-35	653108.9610	1537631.9700	790.59	120+19.39	296.38 RT
36	BL-36	653110.6100	1538183.8360	803.18	125+71.26	296.90 RT
37	BL-37	653112.2260	1538516.3240	794.69	130+22.51	217.29 RT
38	BL-38	653101.4460	1538788.5990	811.61	132+91.28	63.38 RT
39	BL-39	653104.4040	1539087.0080	813.37	134+68.91	169.67 LT

BY

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
40	BY-40	653159.6528	1526878.6399	777.84	12+24.62	8.23 RT
2	W5516-2	653107.6560	1527440.7200	773.35	17+88.60	15.59 LT
41	BY-41	652430.7687	1527691.4144	773.49	20+52.16	640.60 RT

BY1

POINT	DESC.	NORTH	EAST	ELEVATION	Y1 STATION	OFFSET
1	W5516-1	654020.9020	1527481.1430	755.86	OUTSIDE PROJECT LIMITS	
2	W5516-2	653107.6560	1527440.7200	773.35	15+13.08	4.23 RT

BY2

POINT	DESC.	NORTH	EAST	ELEVATION	Y2 STATION	OFFSET
42	BY-42	653588.8039	1529678.1368	756.70	19+72.86	20.33 RT
43	BY-43	653131.3881	1529714.7648	740.20	15+13.52	16.05 RT
44	BY-44	652413.8694	1529748.4721	694.15	OUTSIDE PROJECT LIMITS	

BY3

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
I16	I3802-16	654370.7340	1531857.2580	672.72	62+49.70	988.15 LT
I15	I3802-15	653192.7790	1531803.8290	669.32	61+91.63	189.59 RT
I89	I3802 BL-89	652401.5790	1531829.5100	666.35	62+14.19	980.89 RT

BY4

POINT	DESC.	NORTH	EAST	ELEVATION	Y3 STATION	OFFSET
45	BY-45	653960.2967	1538912.9100	813.61	18+12.79	30.19 RT
39	BL-39	653104.4040	1539087.0080	813.37	10+81.88	281.68 RT

BY4

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
3	W5516-3	652396.2650	1539110.9250	815.32	141+09.87	27.91 RT
4	W5516-4	651818.7160	1539462.4010	819.85	OUTSIDE PROJECT LIMITS	

BENCH MARKS (NAVD88)

BM1 ELEVATION = 764.18'
N 653725 E 1527528
CHISELED SQUARE IN THE NORTHWEST CORNER OF A CONCRETE SIGN PAD FOR HIGHEST PRAISE FAMILY WORSHIP CENTER
L STATION 17+92 639' LEFT

BM2 ELEVATION = 732.72'
N 652391 E 1532806
RAIL ROAD SPIKE IN THE NORTHWEST ROOT OF A 6" OAK
L STATION 71+91 995' RIGHT

BM3 ELEVATION = 803.35'
N 654035 E 1538657
RAIL ROAD SPIKE IN THE NORTHEAST ROOT OF A 36" MAPLE
L STATION 128+50 695' LEFT

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "I3802-12"
WITH NAD 83/NSRS 2007 STATE PLANE GRID COORDINATES OF NORTHING: 641735.246(ft) EASTING: 1535065.380(ft)
ELEVATION: 708.81'(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99985319
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "I3802-12" TO -L- STATION 10+00.00 IS
N 36°15'40.36" W 14,215.88'
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

NOTES:

1. *THE SITE CALIBRATION SHOWN IS BASED UPON A NETWORK TIED TO THE NCGS CORS (CONTINUOUSLY OPERATING REFERENCE NETWORK) NAD 832007 ADJUSTMENT. THIS CALIBRATION WILL ALLOW THE END USER TO WORKWITHIN THE SAME COORDINATE SYSTEM WHEN USING RTK (REAL TIME KINEMATIC) GPS AND A LOCAL BASE STATION. IF ANOTHER SYSTEM SUCH AS VRS (VIRTUAL REFERENCE STATION) IS USED, ADDITIONAL FIELD TIES MAY BE NEEDED TO REDUCE POSSIBLE ERRORS, OR BIASES.*

▲ *INDICATES GEODETIC CONTROL MONUMENTS USED OR SET FOR HORIZONTAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT.*

PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.
NETWORK ESTABLISHED FROM NCGS REAL TIME NETWORK
SEE GPS CALIBRATION SHEET FOR HORIZONTAL AND VERTICAL COORDINATE VALUES.

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6/25/2015
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ICA ENGINEERING, INC.

PROJ. REFERENCE NO.	SHEET NO.
W-5516	1D-1

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CENTERLINE COORDINATE LIST

Point #	Chain	Station	Northing (Y)	Easting (X)
1	L	10+00.000	653203.6797	1526655.4020
2	L	11+00.000	653190.9733	1526754.5915
3	L	12+00.000	653178.2668	1526853.7809
4	L	13+00.000	653165.5603	1526952.9704
5	L	14+00.000	653152.8539	1527052.1598
6	L	15+00.000	653140.1474	1527151.3493
7	L	16+00.000	653127.4410	1527250.5387
8	L	17+00.000	653114.7345	1527349.7282
9	L	18+00.000	653102.0280	1527448.9176
10	L	19+00.000	653089.9198	1527548.1787
11	L	20+00.000	653082.0691	1527647.8601
12	L	21+00.000	653079.1122	1527747.8063
13	L	22+00.000	653081.0562	1527847.7774
14	L	23+00.000	653087.8965	1527947.5332
15	L	24+00.000	653099.6166	1528046.8339
16	L	25+00.000	653116.1883	1528145.4411
17	L	26+00.000	653137.5719	1528243.1178
18	L	27+00.000	653163.7160	1528339.6294
19	L	28+00.000	653193.2189	1528435.1777
20	L	29+00.000	653222.8592	1528530.6840
21	L	30+00.000	653252.4996	1528626.1903
22	L	31+00.000	653282.1399	1528721.6966
23	L	32+00.000	653311.6057	1528817.2560
24	L	33+00.000	653336.5347	1528914.0798
25	L	34+00.000	653354.9582	1529012.3492
26	L	35+00.000	653366.7943	1529111.6276
27	L	36+00.000	653371.9905	1529211.4739
28	L	37+00.000	653372.5471	1529311.4717
29	L	38+00.000	653372.9412	1529411.4710
30	L	39+00.000	653373.3354	1529511.4702
31	L	40+00.000	653373.7295	1529611.4694
32	L	41+00.000	653374.1237	1529711.4686
33	L	42+00.000	653374.5178	1529811.4678
34	L	43+00.000	653374.9119	1529911.4671
35	L	44+00.000	653375.3061	1530011.4663
36	L	45+00.000	653375.7002	1530111.4655
37	L	46+00.000	653376.0944	1530211.4647
38	L	47+00.000	653376.4885	1530311.4640
39	L	48+00.000	653376.8826	1530411.4632
40	L	49+00.000	653377.2768	1530511.4624
41	L	50+00.000	653377.6709	1530611.4616
42	L	51+00.000	653378.0651	1530711.4609
43	L	52+00.000	653378.4592	1530811.4601
44	L	53+00.000	653378.8533	1530911.4593
45	L	54+00.000	653379.2475	1531011.4585
46	L	55+00.000	653379.6416	1531111.4577
47	L	56+00.000	653380.0358	1531211.4570
48	L	57+00.000	653380.4299	1531311.4562
49	L	58+00.000	653380.8240	1531411.4554
50	L	59+00.000	653381.2182	1531511.4546
51	L	60+00.000	653381.6123	1531611.4539
52	L	61+00.000	653382.0065	1531711.4531
53	L	62+00.000	653382.4006	1531811.4523
54	L	63+00.000	653382.7947	1531911.4515
55	L	64+00.000	653383.1889	1532011.4508
56	L	65+00.000	653383.5830	1532111.4500
57	L	66+00.000	653383.9772	1532211.4492
58	L	67+00.000	653384.3713	1532311.4484
59	L	68+00.000	653384.7654	1532411.4477
60	L	69+00.000	653385.1596	1532511.4469
61	L	70+00.000	653385.5537	1532611.4461
62	L	71+00.000	653385.9478	1532711.4453
63	L	72+00.000	653386.3420	1532811.4445
64	L	73+00.000	653386.7361	1532911.4438
65	L	74+00.000	653387.1303	1533011.4430
66	L	75+00.000	653387.5244	1533111.4422
67	L	76+00.000	653387.9185	1533211.4414
68	L	77+00.000	653388.3127	1533311.4407
69	L	78+00.000	653388.7068	1533411.4399
70	L	79+00.000	653389.1010	1533511.4391
71	L	80+00.000	653389.4951	1533611.4383
72	L	81+00.000	653389.8892	1533711.4376
73	L	82+00.000	653390.2834	1533811.4368
74	L	83+00.000	653390.6775	1533911.4360
75	L	84+00.000	653391.0717	1534011.4352
76	L	85+00.000	653391.4658	1534111.4344
77	L	86+00.000	653391.8599	1534211.4337
78	L	87+00.000	653392.2541	1534311.4329
79	L	88+00.000	653392.6482	1534411.4321
80	L	89+00.000	653393.0424	1534511.4313
81	L	90+00.000	653393.4365	1534611.4306
82	L	91+00.000	653393.8306	1534711.4298
83	L	92+00.000	653394.2248	1534811.4290
84	L	93+00.000	653394.6189	1534911.4282
85	L	94+00.000	653395.0131	1535011.4275
86	L	95+00.000	653395.4072	1535111.4267
87	L	96+00.000	653395.8013	1535211.4259
88	L	97+00.000	653396.1955	1535311.4251
89	L	98+00.000	653396.5896	1535411.4243
90	L	99+00.000	653396.9838	1535511.4236
91	L	100+00.000	653397.3779	1535611.4228
92	L	101+00.000	653397.7720	1535711.4220
93	L	102+00.000	653398.1662	1535811.4212
94	L	103+00.000	653398.5603	1535911.4205
95	L	104+00.000	653398.9545	1536011.4197
96	L	105+00.000	653399.3486	1536111.4189
97	L	106+00.000	653399.7427	1536211.4181
98	L	107+00.000	653400.1369	1536311.4174
99	L	108+00.000	653400.5310	1536411.4166
100	L	109+00.000	653400.9251	1536511.4158
101	L	110+00.000	653401.3193	1536611.4150
102	L	111+00.000	653401.7134	1536711.4143
103	L	112+00.000	653402.1076	1536811.4135
104	L	113+00.000	653402.5017	1536911.4127
105	L	114+00.000	653402.8958	1537011.4119
106	L	115+00.000	653403.2900	1537111.4111
107	L	116+00.000	653403.6841	1537211.4104
108	L	117+00.000	653404.0783	1537311.4096
109	L	118+00.000	653404.4724	1537411.4088
110	L	119+00.000	653404.8665	1537511.4080
111	L	120+00.000	653405.2607	1537611.4073
112	L	121+00.000	653405.6548	1537711.4065
113	L	122+00.000	653406.0490	1537811.4057
114	L	123+00.000	653406.4431	1537911.4049
115	L	124+00.000	653406.8372	1538011.4042
116	L	125+00.000	653407.2314	1538111.4034
117	L	126+00.000	653407.4899	1538211.4023
118	L	127+00.000	653400.6015	1538311.1133
119	L	128+00.000	653382.6994	1538409.4455
120	L	129+00.000	653354.0043	1538505.1864
121	L	130+00.000	653314.8702	1538597.1550
122	L	131+00.000	653265.7797	1538684.2173
123	L	132+00.000	653207.3382	1538765.2994
124	L	133+00.000	653140.2665	1538839.4014
125	L	134+00.000	653065.3918	1538905.6093
126	L	135+00.000	652983.6374	1538963.1066
127	L	136+00.000	652896.0118	1539011.1843
128	L	137+00.000	652803.5955	1539049.2493
129	L	138+00.000	652707.5283	1539076.8323
130	L	139+00.000	652609.2834	1539095.4283
131	L	140+00.000	652510.8491	1539113.0550
132	L	141+00.000	652413.3421	1539135.0000
133	L	142+00.000	652319.1303	1539168.3484
134	L	143+00.000	652228.3180	1539210.1926
135	L	144+00.000	652139.6215	1539256.3594
136	L	145+00.000	652051.6019	1539303.8206
137	L	145+61.232	651997.7060	1539332.8819
138	Y1	10+00.000	653557.7645	1527453.1995
139	Y1	11+00.000	653458.1948	1527443.9332
140	Y1	12+00.000	653358.6250	1527434.6670
141	Y1	13+00.000	653258.9554	1527426.7601
142	Y1	14+00.000	653159.0599	1527429.5660
143	Y1	15+00.000	653060.2936	1527444.8044
144	Y1	16+00.000	652964.1978	1527472.2376
145	Y1	17+00.000	652871.9715	1527510.7951
146	Y1	18+00.000	652780.8047	1527551.8879
147	Y1	19+00.000	652689.6379	1527592.9807
148	Y1	19+65.721	652629.7224	1527619.9872
149	Y2	10+00.000	653958.7400	1529659.3777
150	Y2	11+00.000	653858.8624	1529654.4812
151	Y2	12+00.000	653758.8950	1529652.0294
152	Y2	13+00.000	653658.9147	1529653.3872
153	Y2	14+00.000	653559.1271	1529659.7403
154	Y2	15+00.000	653459.5449	1529668.8720
155	Y2	16+00.000	653359.9635	1529678.0124
156	Y2	17+00.000	653260.3820	1529687.1516
157	Y2	18+00.000	653160.7831	1529696.0985
158	Y2	19+00.000	653061.1744	1529704.9365
159	Y2	20+00.000	652961.5658	1529713.7746
160	Y2	21+00.000	652861.9571	1529722.6126
161	Y2	21+08.005	652853.9829	1529723.3201
162	Y3	10+00.000	654165.4451	1538823.8655
163	Y3	11+00.000	654069.4938	1538852.0315
164	Y3	12+00.000	653973.4425	1538879.8550
165	Y3	13+00.000	653877.3817	1538907.6457
166	Y3	14+00.000	653779.9331	1538929.8219
167	Y3	15+00.000	653680.5303	1538940.1700
168	Y3	16+00.000	653580.6036	1538938.5391
169	Y3	17+00.000	653481.5915	1538924.9528
170	Y3	18+00.000	653384.9190	1538899.6066
171	Y3	19+00.000	653291.9777	1538862.8654
172	Y3	20+00.000	653204.1055	1538815.2579
173	Y3	20+30.151	653178.7983	1538798.8708
174	Y3A	10+00.000	653496.3271	1538927.7469
175	Y3A	11+00.000	653452.0413	1539013.8278
176	Y3A	12+00.000	653356.5507	1539039.6347
177	Y3A	13+00.000	653257.2359	1539051.2222
178	Y3A	13+19.256	653238.0487	1539052.8525

Point #	Chain	Station	Northing (Y)	Easting (X)

Point #	Chain	Station	Northing (Y)	Easting (X)

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ICA Engineering
5121 Kingdom Way, Suite 100
Raleigh, NC 27607
NC License No: F-0258

PROJECT REFERENCE NO.	SHEET NO.
W-5516	2A-1

RW SHEET NO.

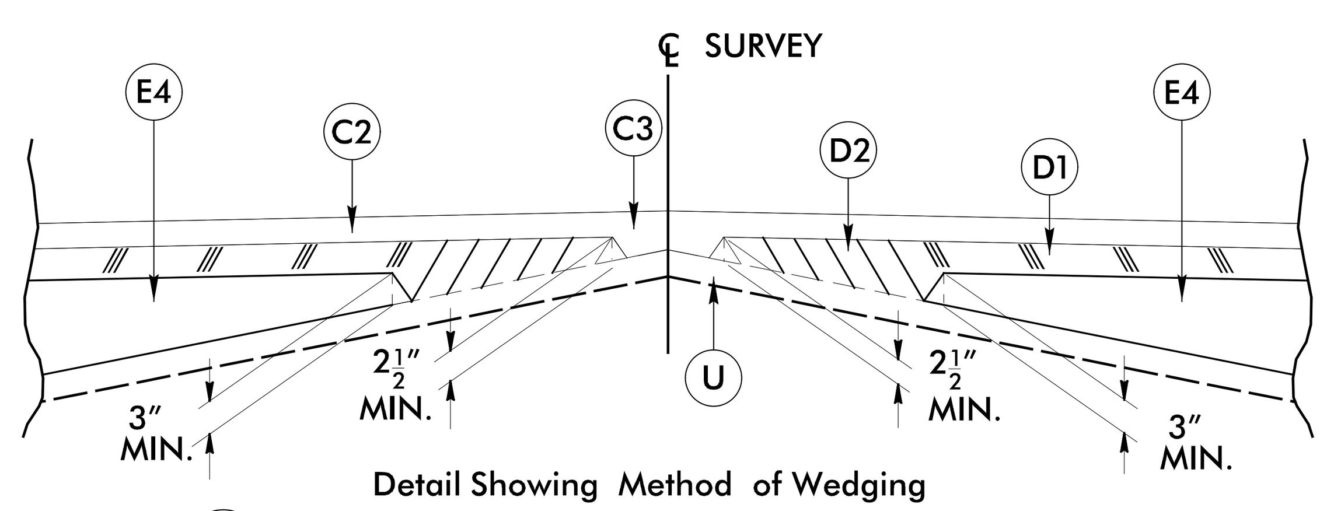
ROADWAY DESIGN ENGINEER — SEAL 22606, DAVID C. WALLER — DocuSigned by: David C. Waller 6/25/2015

PAVEMENT DESIGN ENGINEER — SEAL 022896, CLARK S. MORRISON — DocuSigned by: Clark S Morrison 6/29/2015

PAVEMENT SCHEDULE
(JUNE 4, 2015)

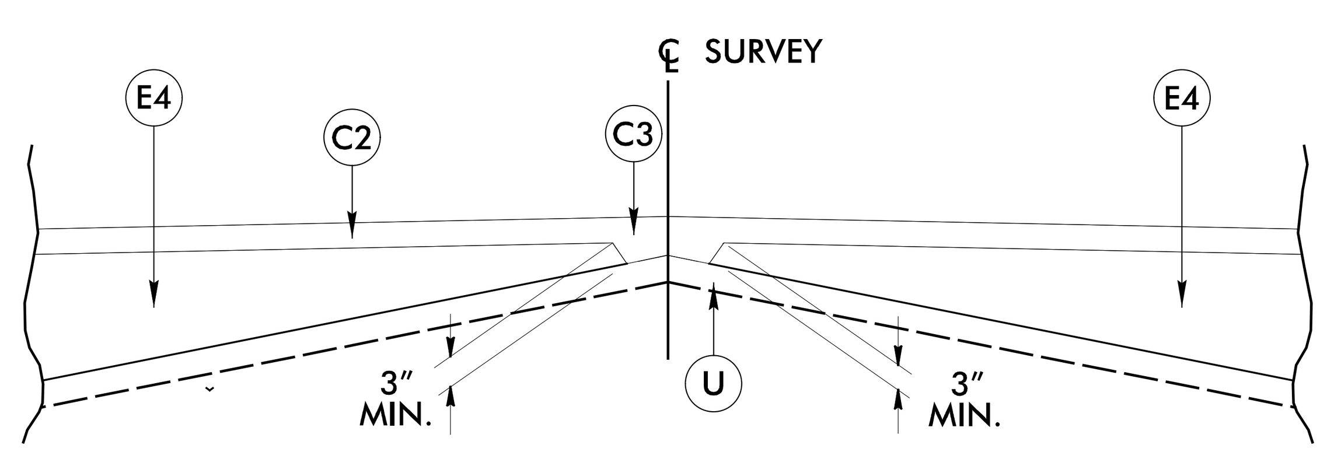
C1	PROP. APPROX. 1½" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.
C2	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
C3	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT TO EXCEED 2" IN DEPTH.
D1	PROP. APPROX. 2½" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 285 LBS. PER SQ. YD.
D2	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 2 1/2" IN DEPTH OR GREATER THAN 4" IN DEPTH.
E1	PROP. APPROX. 4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
E2	PROP. APPROX. 4½" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 513 LBS. PER SQ. YD.
E3	PROP. APPROX. 5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 570 LBS. PER SQ. YD.
E4	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 3" IN DEPTH OR GREATER THAN 5 1/2" IN DEPTH.
J	PROP. APPROX. 6" AGGREGATE BASE COURSE
K	SUBGRADE TO BE TREATED WITH LIME TO A DEPTH OF 8", AT A RATE OF 20 LBS. PER SQ. YD. AS DIRECTED BY THE ENGINEER. OR SUBGRADE TO BE TREATED WITH CEMENT TO A DEPTH OF 7". AT A RATE OF 55 LBS. PER SQ. TD. AS DIRECTED BY THE ENGINEER.
N	GEOTEXTILE FOR PAVEMENT STABILIZATION
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	VARIABLE DEPTH ASPHALT PAVEMENT (SEE STANDARD WEDGING DETAIL ON THIS PAGE.)

NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.



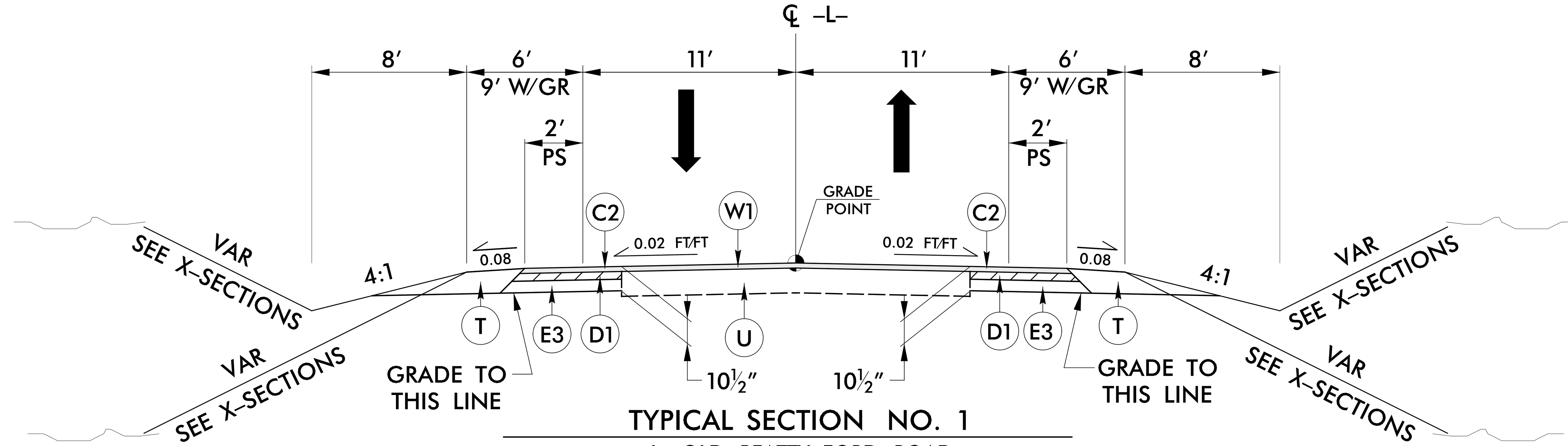
Detail Showing Method of Wedging

W1



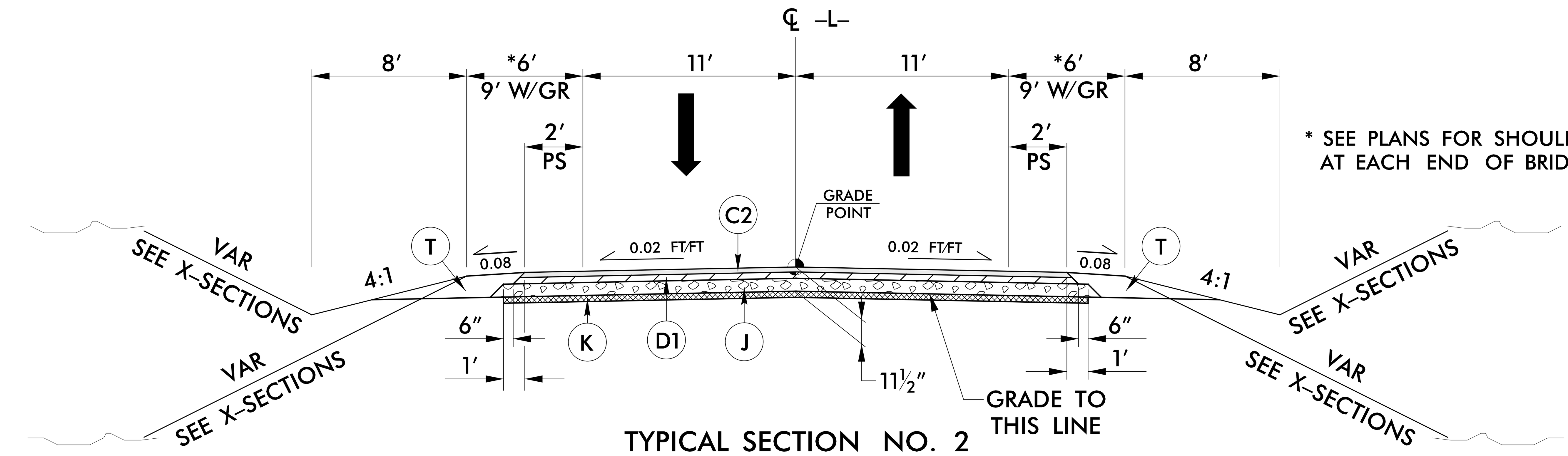
Detail Showing Method of Wedging

W2



TYPICAL SECTION NO. 1
-L- OLD BEATTY FORD ROAD

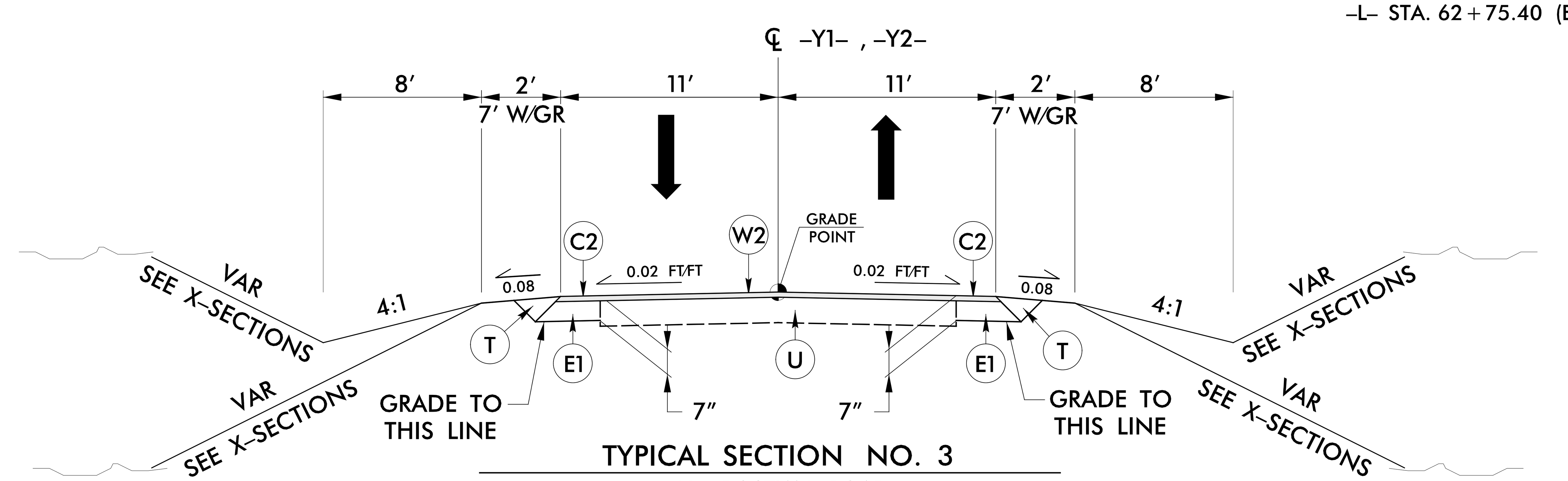
USE TYPICAL SECTION NO. 1 FOR:
-L- STA. 15+50.00 TO STA. 17+81.60
-L- STA. 137+62.60 TO STA. 141+70.00



* SEE PLANS FOR SHOULDER TAPERS AT EACH END OF BRIDGE

TYPICAL SECTION NO. 2
-L- OLD BEATTY FORD ROAD

USE TYPICAL SECTION NO. 2 FOR:
-L- STA. 17+81.60 TO STA. 57+45.40 (BEGIN BRIDGE)
-L- STA. 62+75.40 (END BRIDGE) TO STA. 137+62.60



TYPICAL SECTION NO. 3
-Y1- BOSTIAN ROAD
-Y2- OLD CHINA GROVE ROAD

USE TYPICAL SECTION NO. 3 FOR:
-Y1- STA. 11+40.00 TO STA. 13+80.21
-Y1- STA. 15+47.64 TO STA. 17+15.00
-Y2- STA. 12+90.00 TO STA. 13+10.00
-Y2- STA. 16+52.86 TO STA. 18+10.00

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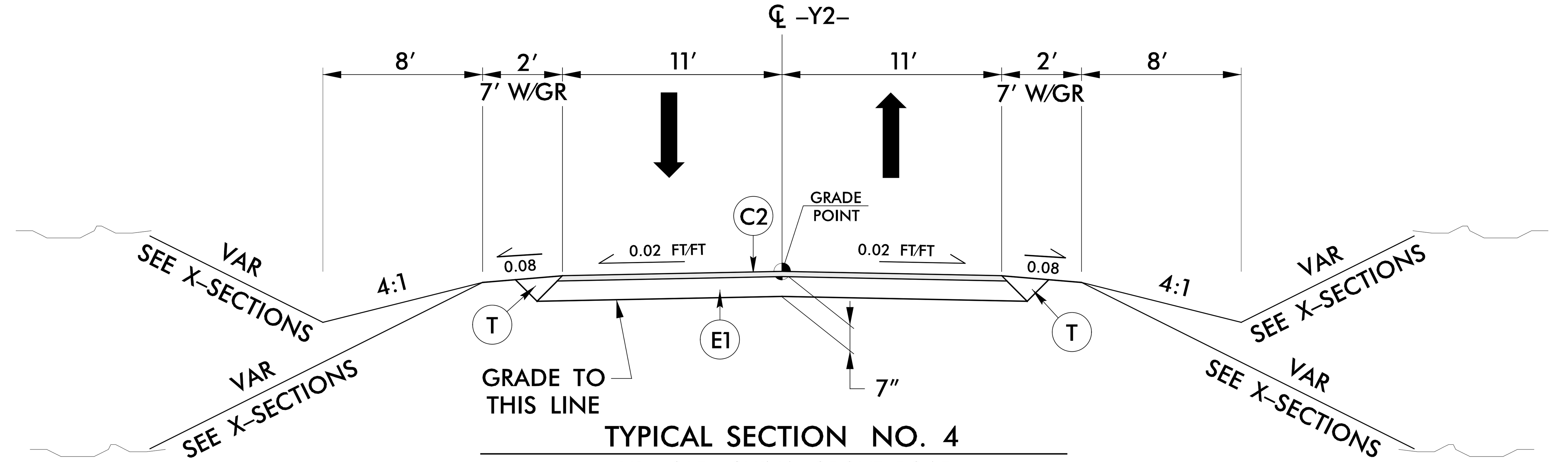
C1	1½″ S9.5B
C2	3″ S9.5B
C3	VAR S9.5B
D1	2½″ I19.0B
D2	VAR I19.0B
E1	4″ B25.0B
E2	4½″ B25.0B
E3	5″ B25.0B
E4	VAR B25.0B
J	6″ ABC
K	STABILIZATION
N	GEOTEXTILE
T	EARTH MATERIAL
U	EXIST. PAVEMENT
W	VAR WEDGING

ICA Engineering
5121 Kingdom Way, Suite 100
Raleigh, NC 27607
NC License No: F-0258

PROJECT REFERENCE NO.	SHEET NO.
W-5516	2A-2
RW SHEET NO.	

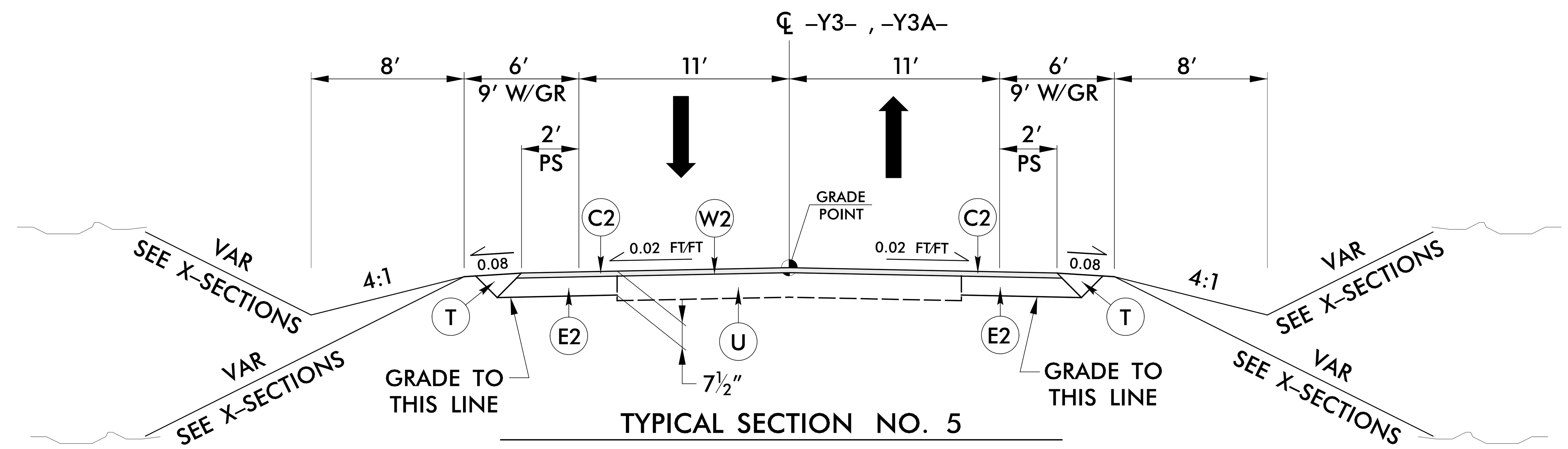
ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 22606 DAVID C. WALLER — David C. Waller 6/25/2015

PAVEMENT DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 022896 CLARK S. MORRISON — Clark S Morrison 6/29/2015



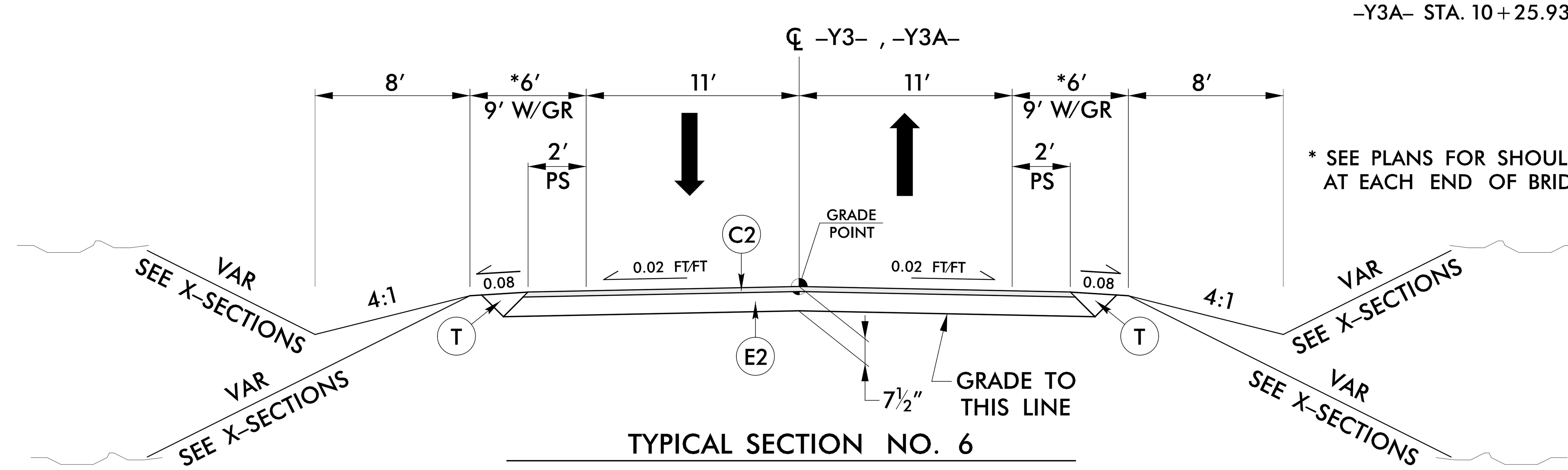
TYPICAL SECTION NO. 4
-Y2- OLD CHINA GROVE ROAD

USE TYPICAL SECTION NO. 4 FOR:
-Y2- STA. 13+10.00 TO STA. 15+18.98



TYPICAL SECTION NO. 5
-Y3- LENTZ ROAD

USE TYPICAL SECTION NO. 5 FOR:
-Y3- STA. 11+15.00 TO STA. 14+50.00
-Y3A- STA. 10+25.93 TO STA. 10+75.16



* SEE PLANS FOR SHOULDER TAPERS AT EACH END OF BRIDGE

TYPICAL SECTION NO. 6
-Y3- LENTZ ROAD

USE TYPICAL SECTION NO. 6 FOR:
-Y3- STA. 14+50.00 TO STA. 19+56.50
-Y3A- STA. 10+75.16 TO STA. 11+44.95

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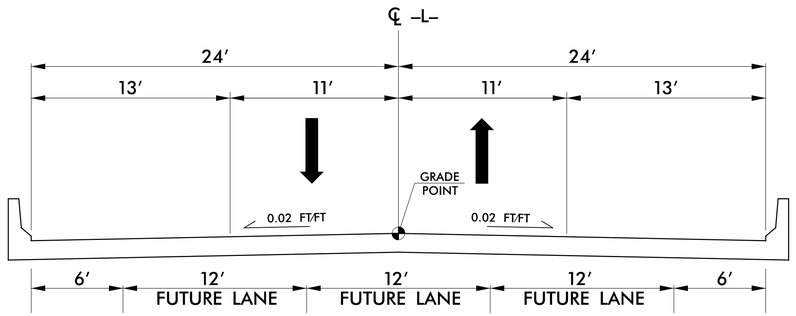
5/14/99

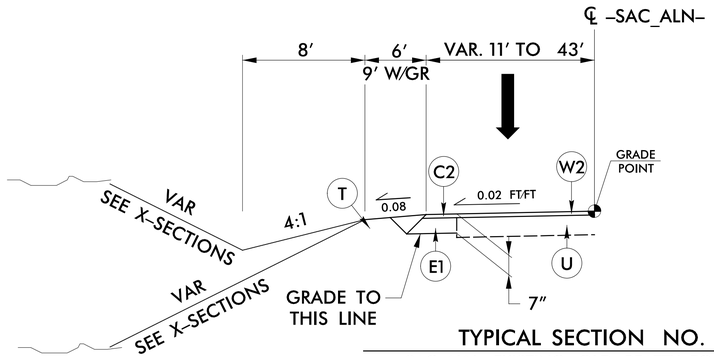
C1	1½" S9.5B
C2	3" S9.5B
C3	VAR S9.5B
D1	2½" I19.0B
D2	VAR I19.0B
E1	4" B25.0B
E2	4½" B25.0B
E3	5" B25.0B
E4	VAR B25.0B
J	6" ABC
K	STABILIZATION
N	GEOTEXTILE
T	EARTH MATERIAL
U	EXIST. PAVEMENT
W	VAR WEDGING



TYPICAL SECTION NO. 7

–L– OLD BEATTY FORD ROAD (BRIDGE)

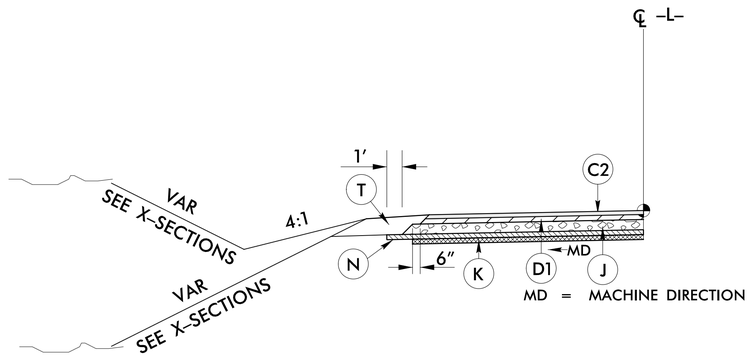
USE TYPICAL SECTION NO. 7 FOR:
–L– STA. 57+45.40 TO STA. 62+75.40



TYPICAL SECTION NO. 8

–SAC_ALN– EXISTING OLD BEATTY FORD ROAD

USE TYPICAL SECTION NO. 8 FOR:
–SAC_ALN– STA. 27+29.41 TO STA. 28+23.80



INSET A

USE GEOTEXTILE FOR PAVEMENT STABLILIZATION
DETAIL FOR GRADED SHOULDER SECTION AS FOLLOWS:

GEOTEXTILE FOR PAVEMENT STABILIZATION

SURVEY LINE	STATION	STATION	OFFSET	SY
–L–	21+50	24+50	CL	1233
–L–	29+50	34+50	CL	2056
–L–	35+50	40+00	CL	1850
–L–	51+50	57+30	CL	2389
–L–	62+89	63+25	CL	148
–L–	85+00	92+50	CL	3083
–L–	106+75	109+50	CL	1131
			TOTAL:	11890

(THESE LOCATIONS TO BE INVESTIGATED DURING CONSTRUCTION)

ICA Engineering
5121 Kingdom Way, Suite 100
Raleigh, NC 27607
NC License No: F-0258

PROJECT REFERENCE NO.	SHEET NO.
W-5516	2A-3
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 22606 ENGINEER DAVID C. WALLER
DocuSigned by: David C. Waller 6/25/2015
89AD3F7156C5435...

PAVEMENT DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 022896 ENGINEER CLARK S. MORRISON
DocuSigned by: Clark S Morrison 6/29/2015
06623B016E4F400...

6/25/2015
R:\Projects\Rdy\w5516_rdy_typ.dgn
ICA ENGINEERING, INC.

DocuSign Envelope ID: E6D448C6-E103-42EA-BEFF-A0BDB87793D4

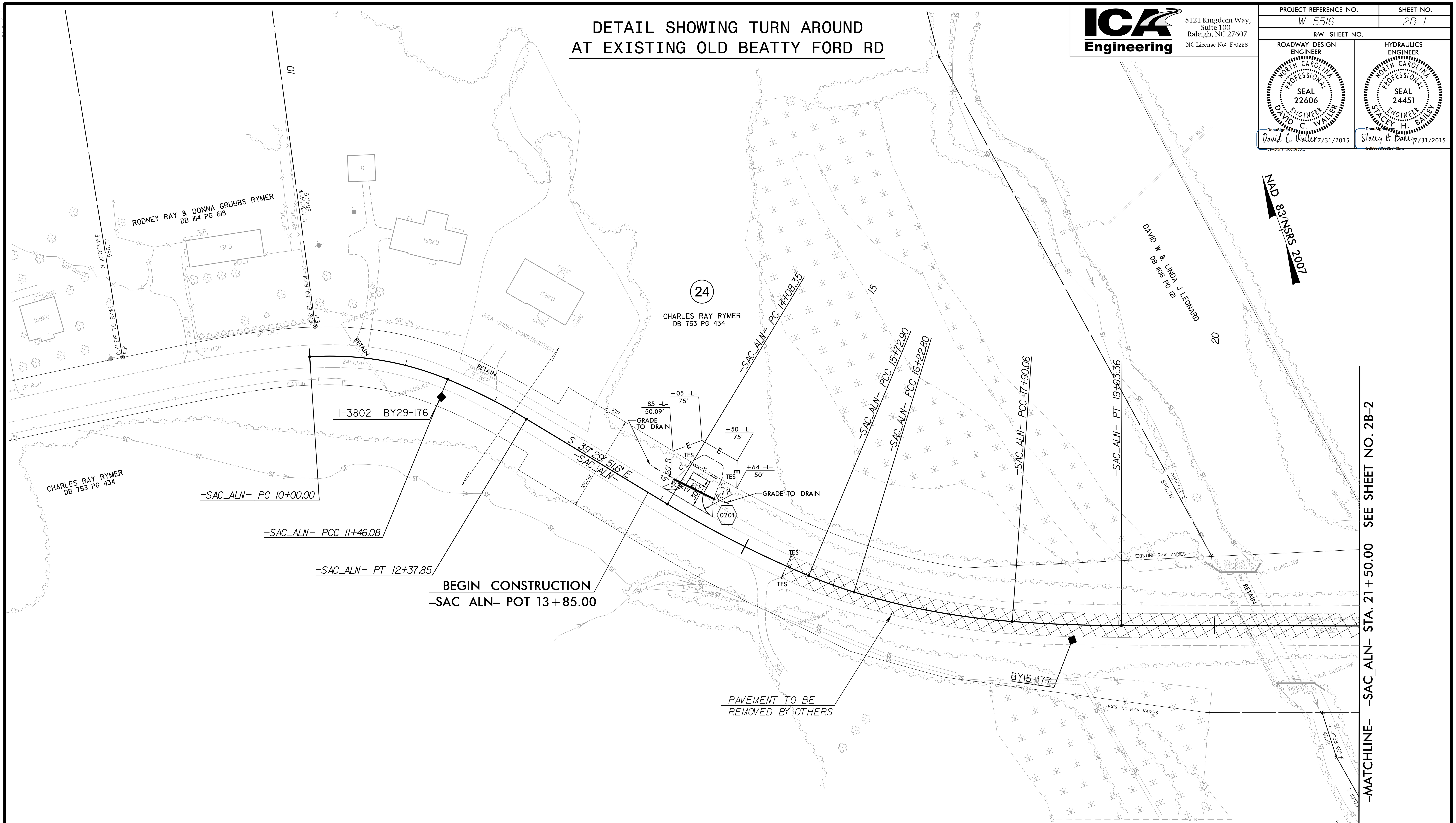
ICA Engineering
5121 Kingdom Way, Suite 100
Raleigh, NC 27607
NC License No: F-0258

PROJECT REFERENCE NO.	SHEET NO.
W-5516	2B-1
RW SHEET NO.	

ROADWAY DESIGN ENGINEER — North Carolina Professional Engineer Seal 22606, David C. Waller — David C. Waller 7/31/2015

HYDRAULICS ENGINEER — North Carolina Professional Engineer Seal 24451, Stacey H. Bailey — Stacey H Bailey 7/31/2015

DETAIL SHOWING TURN AROUND AT EXISTING OLD BEATTY FORD RD



-SAC_ALN-

PI Sta 10+74.34	PI Sta 11+92.06	PI Sta 14+90.77	PI Sta 15+97.87
Δ = 26° 09' 21.6" (RT)	Δ = 8° 45' 47.1" (RT)	Δ = 8° 27' 18.8" (LT)	Δ = 5° 43' 07.5" (LT)
D = 17° 54' 17.8"	D = 9° 32' 57.5"	D = 5° 08' 19.1"	D = 11° 27' 33.0"
L = 146.08'	L = 91.77'	L = 164.54'	L = 49.91'
T = 74.34'	T = 45.97'	T = 82.42'	T = 24.97'
R = 320.00'	R = 600.00'	R = 1,115.00'	R = 500.00'

PI Sta 17+06.78	PI Sta 18+46.73
Δ = 12° 46' 38.3" (LT)	Δ = 4° 03' 27.3" (LT)
D = 7° 38' 22.0"	D = 3° 34' 51.5"
L = 167.25'	L = 113.31'
T = 83.98'	T = 56.68'
R = 750.00'	R = 1,600.00'

7/31/2015

DocuSign Envelope ID: E6D448C6-E103-42EA-BEFF-A0BDB87793D4

ICA Engineering
5121 Kingdom Way, Suite 100
Raleigh, NC 27607
NC License No: F-0258

PROJECT REFERENCE NO.	SHEET NO.
W-5516	2B-2
RW SHEET NO.	

ROADWAY DESIGN ENGINEER — North Carolina Professional Engineer Seal 22606, David C. Waller — David C. Waller 7/31/2015

HYDRAULICS ENGINEER — North Carolina Professional Engineer Seal 24451, Stacey H. Bailey — Stacey H Bailey 7/31/2015

DETAIL SHOWING CUL-DE-SAC AT EXISTING OLD BEATTY FORD RD

7/31/2015

CONTRACT STANDARDS AND DEVELOPMENT UNIT
Office 919-707-6950 FAX 919-250-4119

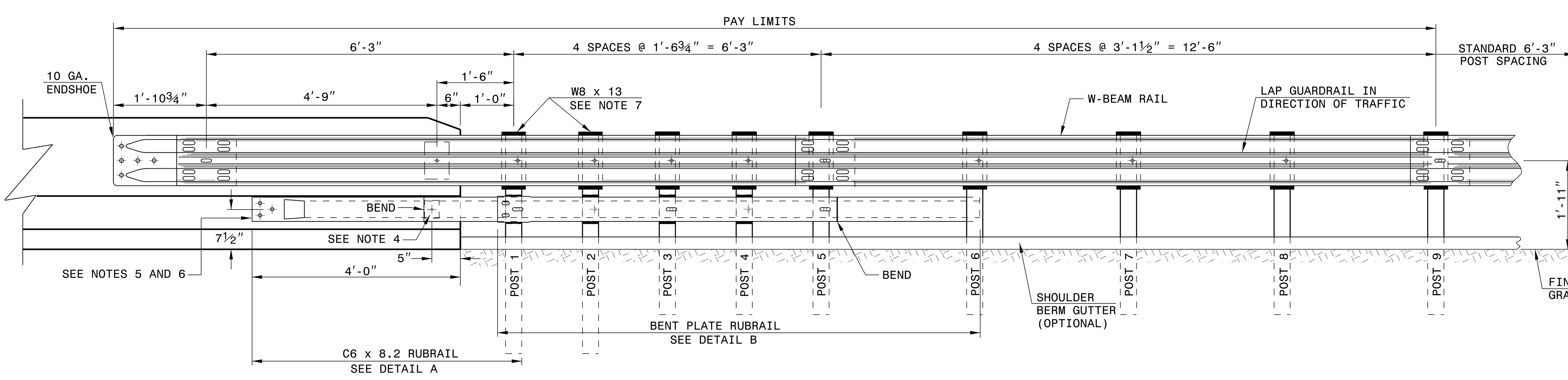
SEAL 022966 — NORTH CAROLINA PROFESSIONAL ENGINEER — Joel S. Howerton — 8/5/2015

SEE TITLE BLOCK

ORIGINAL BY: J HOWERTON DATE: 06-22-12
MODIFIED BY: DATE:
CHECKED BY: DATE:
FILE SPEC.:

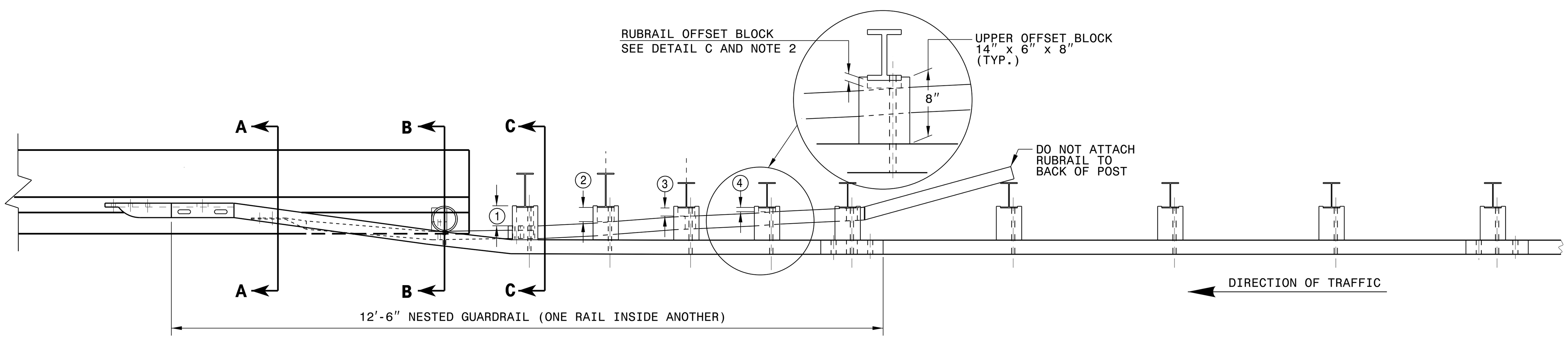
STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR
GUARDRAIL ANCHOR UNIT
GUARDRAIL ANCHOR UNIT TYPE B-77
FOR F-SHAPE BARRIER



ELEVATION

GENERAL NOTES:
1) POSTS 1 THROUGH 5 REQUIRE AN ADDITIONAL HOLE TO ATTACH LOWER BLOCKOUTS AND/OR RUBRAIL.
2) RUBRAIL BLOCKOUTS LOCATED ON POSTS 1 THROUGH 4 ARE OFFSET DRILLED AND SECURED WITH ⅝" BUTTONHEAD BOLTS (SEE CHART FOR BOLT LENGTHS). SECURE BLOCKS ONLY TO POSTS 2 AND 4. SECURE RUBRAIL AND BLOCKOUTS TO POSTS 1 AND 3. RUBRAIL IS SECURED TO POST 5 WITH A ⅝" x 4½" BUTTONHEAD BOLT. RUBRAIL IS FLARED TO BACK OF POST 6 AND NOT SECURED.
3) STEEL SPACER TUBE IS A SCHEDULE 40 GALVANIZED PIPE 6" INSIDE DIAMETER x 9" LONG. ATTACH TUBE TO GUARDRAIL ONLY WITH ⅝" x 1¼" LONG BUTTONHEAD BOLT AND RECTANGULAR PLATE WASHER.
4) SEE DETAIL D FOR SLOPED RUBRAIL BLOCKOUT. BLOCKOUT IS ATTACHED TO RAIL ELEMENT ONLY. USE ⅜" x 3" LAG BOLT WITH FLAT WASHER.
5) SHOP FABRICATE THE C6 x 8.2 RUBRAIL END TO BE CONSISTENT WITH THE SLOPE OF THE F SHAPE AND ATTACH FLUSH WITH THE SLOPED TOE OF THE BARRIER OR BRIDGE RAIL.
6) ANCHORAGE:
(a) AT EXISTING BRIDGE RAIL AND NEW OR EXISTING BARRIERS, ANCHOR RUBRAIL USING THREE ⅝" x 6" CHEMICALLY ANCHORED BOLTS WITH WASHERS. MAXIMUM PROJECTION FOR BOLTS IS ½".
(b) AT EXISTING BRIDGE RAIL AND NEW OR EXISTING BARRIERS, ANCHOR THE W-BEAM END SHOE USING A 4 BOLT HOLD DOWN PLATE (SEE STD. DWG. 862.04). A 4 BOLT INSERT ASSEMBLY IS ALLOWED ON PRECAST REINFORCED CONCRETE BARRIER (SEE STD. DWG. 857.01). INSTALL THE W-BEAM END SHOE BEHIND THE NESTED W-BEAM ELEMENTS.
(c) AT NEW BRIDGE RAIL, ANCHOR THE W-BEAM END SHOE AND RUBRAIL AS DETAILED ON THE STRUCTURE PLANS.
7) POSTS 1 AND 2 ARE W8 x 13, 7'-6" LONG. ALL OTHER POSTS IN THE ANCHOR UNIT ARE W6 x 8.5.

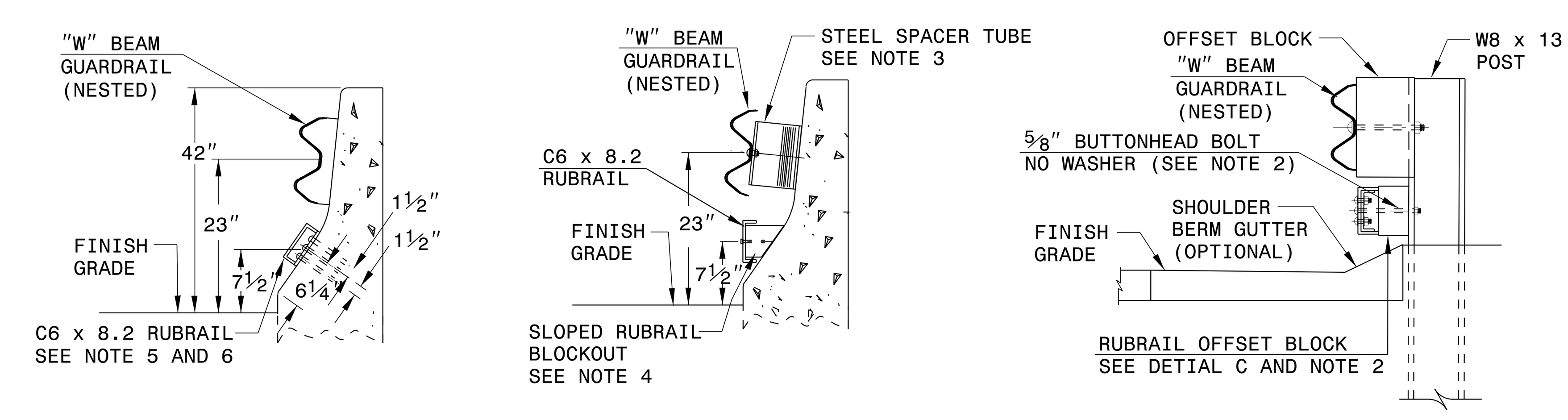


PLAN

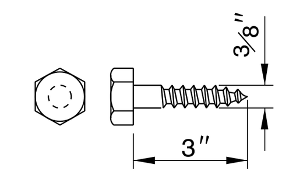
GUARDRAIL ANCHOR UNIT TYPE B-77

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

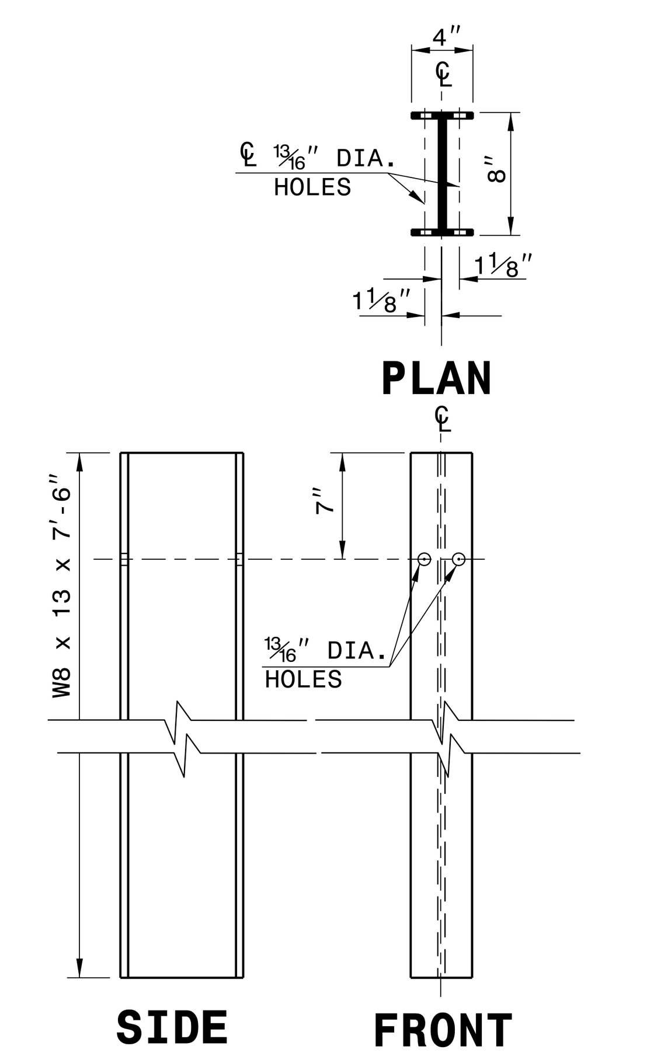
ENGLISH DETAIL DRAWING FOR
STRUCTURE ANCHOR UNIT
GUARDRAIL ANCHOR UNIT TYPE B-77
FOR F-SHAPE BARRIER



SECTION A-A **SECTION B-B** **SECTION C-C**



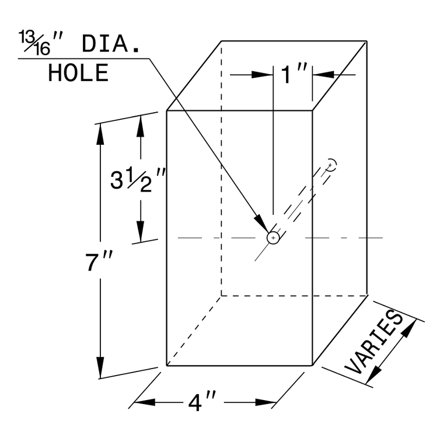
DETAIL E
LAG BOLT



PLAN

SIDE **FRONT**

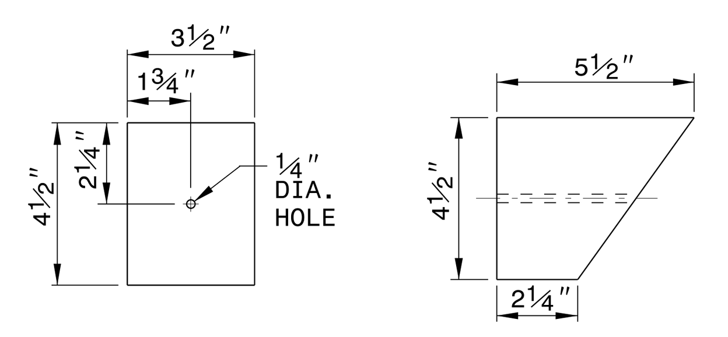
DETAIL F STEEL POST
"W8 X 13 X 7'-6"



RUBRAIL BLOCKS 7" HIGH x 4" WIDE		
POST	THICKNESS	BOLT LENGTH
1	4¼"	9"
2	3¼"	5" *
3	2"	6"
4	1"	3" *

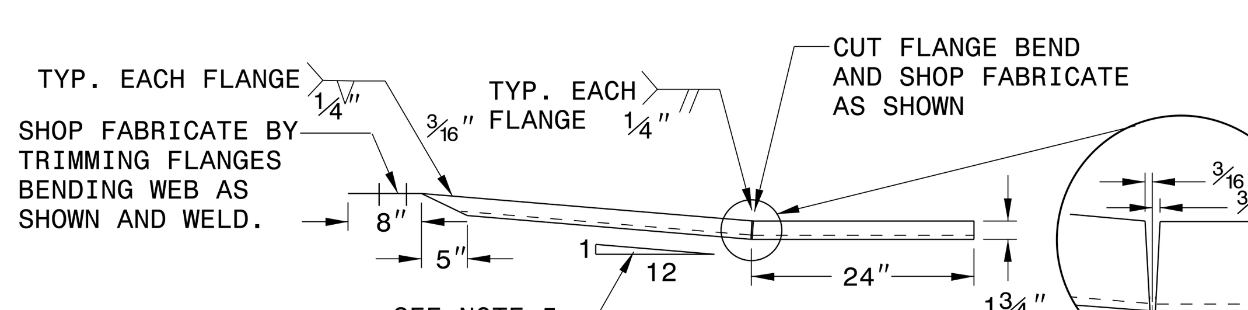
* BOLTS FOR POSTS 2 AND 4 ARE USED TO ATTACH BLOCK TO POST. RUBRAIL NOT ATTACHED TO BLOCK.

DETAIL C
RUBRAIL BLOCKOUT

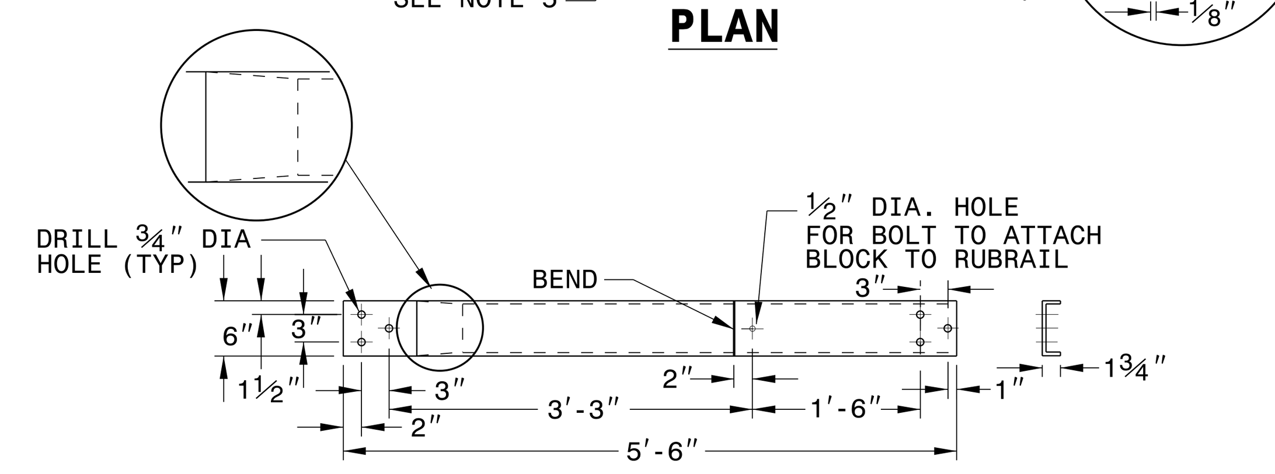


FRONT **SIDE**

DETAIL D
SLOPED RUBRAIL BLOCKOUT

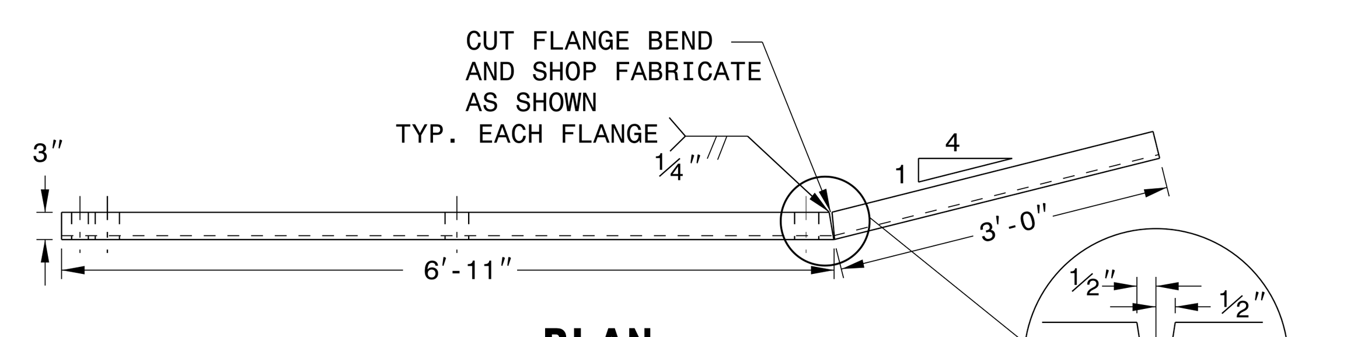


PLAN

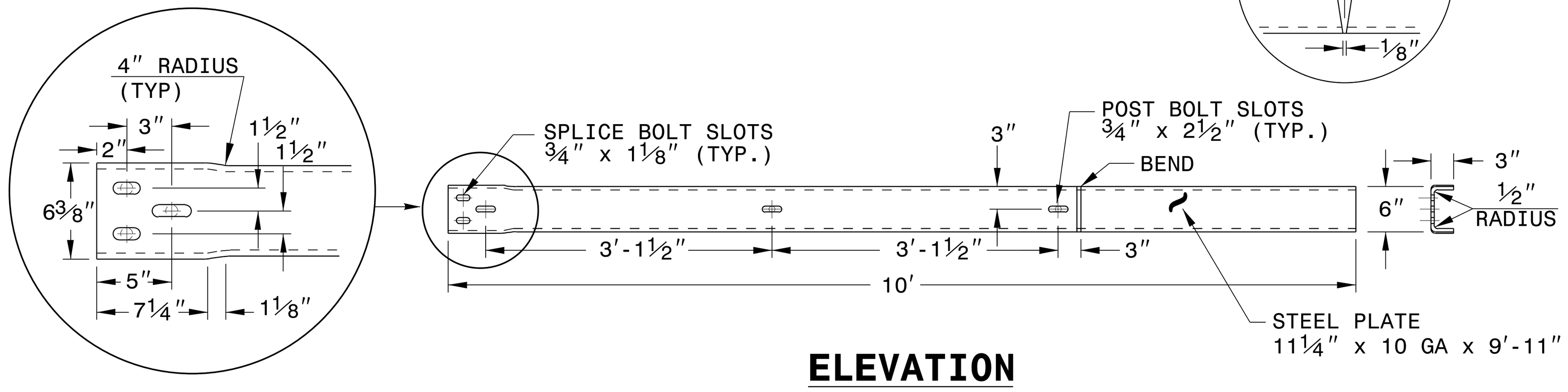


ELEVATION

DETAIL A
C6 x 8.2 RUBRAIL



PLAN



ELEVATION

DETAIL B
BENT PLATE RUBRAIL

GUARDRAIL ANCHOR UNIT TYPE B-77

$$$$$$$$SYSTIME$$$$
$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$
$$$$$$USERNAME$$$$

12/06/07

COMPUTED BY: HWB DATE: 7-20-2015
CHECKED BY: DCW DATE: 7-20-2015

Earthwork quantities are calculated by ICA Engineering. These earthwork quantities are based in part on subsurface data provided by the Geotechnical Engineering Unit.

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

ICA Engineering
5121 Kingdom Way, Suite 100
Raleigh, NC 27607
NC License No: F-0258

PROJECT REFERENCE NO.	SHEET NO.
W-5516	3B-1

SUMMARY OF EARTHWORK

IN CUBIC YARDS

LOCATION	UNCLASSIFIED EXCAVATION	UNDERCUT	EMBT + %	BORROW	WASTE
SUMMARY NO. 1					
–L– 15 + 50.00 TO –L– 42 + 00.00	14,252		56,532	42,280	
–Y1– 11 + 40.00 TO –Y1– 14 + 44.45	108		73		35
–Y1– 14 + 67.40 TO –Y1– 17 + 15.00	28		38	10	
–Y2– 12 + 90.00 TO –Y2– 15 + 74.88	2,019		0		2,019
–Y2– 15 + 96.96 TO –Y2– 18 + 10.00	102		30		72
TOTAL SUMMARY NO. 1	16,509		56,673	42,290	2,126
SUMMARY NO. 2					
–L– 42 + 00.00 TO –L– 57 + 45.40	3,089		37,344	34,255	
TOTAL SUMMARY NO. 2	3,089		37,344	34,255	
SUB–TOTAL SUMMARIES NOS. 1 thru 2	19,598		94,017	76,545	2,126
(WEST OF I–85)					
WASTE IN LIEU OF BORROW				–2,126	–2,126
TOTAL SUMMARIES NOS. 1 thru 2	19,598		94,017	74,419	
(WEST OF I–85)					
SUMMARY NO. 3					
–L– 62 + 75.40 TO –L– 90 + 00.00	147,412	50	15,110		132,352
TOTAL SUMMARY NO. 3	147,412	50	15,110		132,352
SUMMARY NO. 4					
–L– 90 + 00.00 TO –L– 120 + 00.00	116,550		9.339		107,211
TOTAL SUMMARY NO. 4	116,550		9,339		107,211
SUMMARY NO. 5					
–L– 120 + 00.00 TO –L– 141 + 70.00	11,111	1,550	4,120		8,541
–Y3– 11 + 15.00 TO –Y3– 20 + 19.04	3,312		306		3,006
–Y3A– 10 + 25.00 TO –Y3A– 11 + 44.95	44		29		15
TOTAL SUMMARY NO. 5	14,467	1,550	4,455		11,562
SUMMARY NO. 6					
–SAC_ALN– 14 + 15.00 TO –SAC_ALN– 14 + 35.00	50				50
–SAC_ALN– 27 + 29.00 TO –SAC_ALN– 28 + 23.80	49		408	359	
TOTAL SUMMARY NO. 6	99		408	359	50

LOCATION	UNCLASSIFIED EXCAVATION	UNDERCUT	EMBT + %	BORROW	WASTE
SUB–TOTAL SUMMARY NOS. 3 thru 6	278,528	1,600	29,312	359	251,175
(EAST OF I–85)					
WASTE IN LIEU OF BORROW				–359	–359
TOTAL SUMMARIES NOS. 3 thru 6	278,528	1,600	29,312		250,816
(EAST OF I–85)					
PROJECT SUB–TOTALS	298,126	1,600	123,329	74,419	250,816
MATERIAL FOR SHOULDER CONSTRUCTION			7,536	7,536	
LOSS DUE TO CLEARING AND GRUBBING	–12,140				–12,140
ADDITIONAL UNDERCUT		350	420	420	350
ROCK WASTE TO REPLACE BORROW					
ADJUST FOR ROCK WASTE					
PROJECT TOTALS	285,986	1,950	131,285	82,375	239,026
EST. 5% TO REPLACE TOP SOIL ON BORROW PIT				4,119	
GRAND TOTALS	285,986	1,950	131,285	86,494	239,026
SAY	286,000			86,500	

–L–, –Y2–, & –Y3– PAVEMENT STRUCTURE VOLUME	10,850 CY
ESTIMATED DDE	5,140 CY
SHALLOW UNDERCUT (PER GEOTECH)	150 CY
CLASS IV SUBGRADE STABILIZATION (PER GEOTECH)	300 TONS
SELECT GRANULAR MATERIAL (PER GEOTECH)	300 CY

7/20/2015
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ICA ENGINEERING INC

NC12259

COMPUTED BY: HWB DATE: 3/15/15

CHECKED BY: DCW DATE: 4/13/15

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

GUARDRAIL SUMMARY

PROJECT REFERENCE NO.	SHEET NO.
W-5516	3B-2

"N" = DISTANCE FROM EDGE OF LANE TO FACE OF GUARDRAIL
TOTAL SHOULDER WIDTH = DISTANCE FROM EDGE OF TRAVEL LANE TO SHOULDER BREAK POINT.
FLARE LENGTH = DISTANCE FROM LAST SECTION OF PARALLEL GUARDRAIL TO END OF GUARDRAIL
W = TOTAL WIDTH OF FLARE FROM BEGINNING OF TAPER TO END OF GUARDRAIL

G = GATING IMPACT ATTENUATOR TYPE 350
NG = NON-GATING IMPACT ATTENUATOR TYPE 350

SURVEY LINE	BEG. STA.	END STA.	LOCATION	LENGTH			WARRANT POINT		"N" DIST. FROM E.O.L.	TOTAL SHOUL WIDTH	FLARE LENGTH		W		ANCHORS								IMPACT ATTENUATOR TYPE 350		SINGLE FACED CONCRETE BARRIER	REMOVE EXISTING GUARDRAIL	REMOVE & STOCKPILE EXISTING GUARDRAIL	REMARKS
				STRAIGHT	SHOP CURVED	DOUBLE FACED	APPROACH END	TRAILING END			APPROACH END	TRAILING END	APPROACH END	TRAILING END	XI MOD	XI	GRAU 350	M-350	XIII	CAT-1	AT-1	TES	B-77	G	NG				
L	21+50.00	24+75.00	RT	325.00			22+50.00	23+75.00	6	9	50	50	1	1			2											
L	21+75.00	25+25.00	LT	350.00			24+25.00	22+75.00	6	9	50	50	1	1			2											
L	28+50.00	40+00.00	LT	1150.00			39+00.00	29+50.00	6	9	50	50	1	1			2											
L	29+00.00	40+00.00	RT	1100.00			30+00.00	39+00.00	6	9	50	50					2											
L	42+00.00	44+50.00	RT	250.00			43+00.00	43+50.00	6	9	50	50	1	1			2											
L	52+39.15	57+45.40	LT	506.25			57+45.40	53+39.15	6	9	-	50	-	1			1						1					
L	52+89.15	57+45.40	RT	456.25			53+89.15	57+45.40	6	9	50	-	1	-			1						1					
L	62+75.40	65+06.65	LT	231.25			62+75.40	62+75.40	13	16	50	-	1	-			1						1					
L	62+75.40	63+81.65	RT	106.25			62+75.40	62+75.40	13	16	-	50	-	1			1						1					
L	85+00.00	91+50.00	RT	650.00			86+00.00	90+50.00	6	9	50	50	1	1			2											
L	85+50.00	93+00.00	LT	750.00			92+00.00	86+50.00	6	9	50	50	1	1			2											
L	106+50.00	110+00.00	LT	350.00			109+00.00	107+50.00	6	9	50	50	1	1			2											
L	106+50.00	110+00.00	RT	350.00			107+50.00	109+00.00	6	9	50	50	1	1			2											
L	136+65.00		LT	25.00																		2					
Y	40+07.25	44+51.00	RT	443.75			44+00.00	44+51.00	6	8	50	-	1	-			1			1								
Y	43+99.00	48+42.75	LT	443.75			44+50.00	43+99.00	6	8	50	-	1	-			1			1								
SAC_ALN	14+11.00	14+38.60	LT	25.00																		2					
SAC_ALN	15+47.00		CL	25.00																		2					
SAC_ALN	27+22.00	28+01.00		125.00																	1						
TOTALS				7662.50													24			2	1	6	4					
DEDUCTIONS FOR ANCHOR UNITS																											
	GRAU 350	24	50.00	-1200.00																							
	B-77	4	18.75	-75.00																							
	CAT-1	2	6.25	-12.50																							
	AT-1	1	6.25	-6.25																							
GRAND TOTAL				6368.75													24			2	1	6	4					
		SAY		**6375**			**5 EACH ADDITIONAL GUARDRAIL POSTS**																					

PAVEMENT REMOVAL SUMMARY

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	YD^2
-L-	16+50	18+35	RT.	206.78
-L-	136+58	137+35	LT.	107.24
-L-	137+79	139+07	LT.	79.08
-Y2-	13+10	15+86	LT./RT.	707.78
-Y3-	13+93	17+04	LT.	584.44
			TOTAL:	1685.32
			SAY:	1,690

6" CONCRETE DRIVEWAY

SURVEY LINE	STATION	LOCATION	WIDTH	SQUARE YARDS
-L-	16+50.00	LT.	10'	7.243
-L-	138+10.00	RT.	11'	7.243
			TOTAL:	14.486
			SAY:	20

CABLE GUIDERAIL ANCHOR SUMMARY

SURVEY LINE	STATION	LOCATION	INTERMED ANCHORS	TERMINAL ANCHORS
-Y-	40+50.00	MED	0	1
-Y-	48+00.00	MED	0	1
		TOTAL:		2
		SAY:		2

SUMMARY OF WOVEN WIRE FENCE

BEG. STA.	END STA.	FABRIC FEET	4" POST	5" POST
-L- 47+50.00 LT	-L- 57+45.40 LT	1100	70	16
-L- 47+50.00 RT	-L- 57+45.40 RT	1100	70	16
-L- 63+29.94 LT	-L- 73+00.00 LT	984.50	63	13
-L- 63+29.94 RT	-L- 73+00.00 RT	987.90	63	13
TOTAL		4402.40	266	58
SAY		4410	270	60

SUMMARY OF TEMPORARY WOVEN WIRE FENCE W/POST INCLUDED

BEG. STA.	END STA.	FABRIC FEET	4" POST	5" POST
-Y- 43+08.77 RT	-Y- 45.35.97 RT	230	14	4
TOTAL		230	14	4
SAY		230		

SHOULDER BERM GUTTER SUMMARY

SURVEY LINE	STATION	STATION	LENGTH
-L-	22+25.00	24+90.00	265.00
-L-	29+50.00	37+22.00	772.00
-L-	55+00.00	57+21.00	221.00
-L-	55+00.00	57+21.00	221.00
-L-	62+89.00	63+30.00	41.00
-L-	62+89.00	63+30.00	41.00
		TOTAL:	1561.00
		SAY:	1565

CABLE GUIDERAIL REMOVAL SUMMARY

SURVEY LINE	STATION	STATION	LENGTH
-Y-	40+50.00	48+00.00	750.00
		TOTAL:	750.00
		SAY:	750.00

DocuSign Envelope ID: 26CB8FD0-7587-4BAB-B81C-DB424D9A5781

NC10478

COMPUTED BY: Stacey H. Bailey DATE: 8/25/2014

CHECKED BY: Alex D. Snider DATE: 6/19/2015

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

PROJECT NO.	SHEET NO.
W-5516	3D-1

Note: Invert Elevations indicated are for Bid Purposes only and shall not be used for project construction stakeout.
See "Standard Specifications For Roads and Structures, Section 300-5".

LIST OF PIPES, ENDWALLS, ETC. (FOR PIPES 48 INCHES & UNDER)

| LINE & STATION | OFFSET | | STRUCTURE NUMBER FROM | STRUCTURE NUMBER TO | TOP ELEVATION FT. | INVERT ELEVATION FT. | INVERT ELEVATION FT. | MINIMUM REQUIRED SLOPE % | Drainage Pipe (RCP, CSP, CAAP, HDPE, or PVC) SIZE 12 | 15 | 18 | 24 | 30 | 36 | 42 | 48 | Drainage Pipe (RCP, CSP, CAAP, HDPE, or PVC) THICKNESS OR GAUGE DO NOT USE RCP | DO NOT USE CSP | DO NOT USE CAAP | DO NOT USE HDPE | DO NOT USE PVC | R. C. PIPE CLASS III 12 | 15 | 18 | 24 | 30 | 36 | 42 | 48 | R. C. PIPE CLASS IV 12 | 15 | 18 | 24 | 30 | 36 | 42 | 48 | 15" SIDE DRAIN PIPE | 18" SIDE DRAIN PIPE | 24" SIDE DRAIN PIPE | ENDWALLS STD. 826.01 FOR 11 (UNLESS NOTED OTHERWISE) CY | REINFORCED ENDWALLS CY | DRAINAGE STRUCTURE MASONRY CY | QUANTITIES FOR DRAINAGE STRUCTURES NOTE: TOTAL LIN. FT. FOR PAY QUANTITY SHALL BE A + (1.3 X B) A 0' THRU 5' EACH | B 5' THRU 10' LIN. FT. | 10' AND ABOVE LIN. FT. | C.B. STD. 840.01 OR STD. 840.02 | FRAME, GRATES, AND HOOD STD. 840.03 GRATE TYPE E | F | G | CONCRETE TRANSITIONAL SECTION D.I. STD. 852.04 OR STD. 852.06 | C.B. STD. 852.05 | OPEN THROAT C.B. STD. 840.04 OR STD. 840.05 | CONCRETE BRIDGE APPROACH D.I. STD. 840.13 | D.I. STD. 840.14 OR STD. 840.15 | D.I. FRAME AND GRATES STD. 840.16 | G.D.I. TYPE "A" STD. 840.17 OR STD. 840.26 | G.D.I. TYPE "B" STD. 840.18 OR STD. 840.27 | G.D.I. TYPE "D" STD. 840.19 OR STD. 840.28 | G.D.I. (W.S. FLAT) FRAME WITH GRATE STD. 840.20 | G.D.I. (W.S. FLAT) FRAME W/ 2 GRATES STD. 840.20 | G.D.I. (W.S. SAG) FRAME W/ GRATE STD. 840.22 | G.D.I. (W.S. SAG) FRAME W/ 2 GRATES STD. 840.22 | G.D.I. (N.S. SAG) FRAME W/ GRATE STD. 840.24 | G.D.I. (N.S. SAG) FRAME W/ 2 GRATES STD. 840.24 | G.D.I. (N.S. FLAT) FRAME W/ GRATE STD. 840.29 | G.D.I. (N.S. FLAT) FRAME W/ 2 GRATES STD. 840.29 | FRAME W/ GRATE FOR DRIVEWAY STD. 840.30 | J.B. STD. 840.31 OR STD. 840.32 | T.B.J.B. STD. 840.34 | T.B.D.I. STD. 840.35 | T.B.D.I. FOR STEEL GRATES STD. 840.36 | STEEL FRAME WITH TWO GRATES STD. 840.37 | TEMP STEEL PLATE COVER MASONRY DRAINAGE | M.H. STD. 840.51, STD. 840.52, OR STD. 840.53 | M.H. FRAME AND COVER STD. 840.54 | ADJUST D.I. | 15" DRAINAGE PIPE ELBOW | 18" DRAINAGE PIPE ELBOW | BERM DITCH OUTLET STD. 850.10 (PER EACH) | BERM DITCH OUTLET STD. 850.11 (PER EACH) | PREFORMED SCOUR HOLE (PER EACH) | ENERGY DISSIPATION BASIN | FLOWABLE FILL CY | CONCRETE COLLARS CL. "B" STD. 840.72 CY | CONCRETE AND BRICK PIPE PLUG STD. 840.71 CY | PIPE REMOVAL LIN. FT. | REMARKS |
|---|---|---

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NC10478

COMPUTED BY: Stacey H. Bailey **DATE:** 8/25/2014

CHECKED BY: Alex D. Snider **DATE:** 6/19/2015

PROJECT NO.	SHEET NO.
W-5516	3D-2

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

Note: Invert Elevations indicated are for Bid Purposes only and shall not be used for project construction stakeout. See "Standard Specifications For Roads and Structures, Section 300-5".

LIST OF PIPES, ENDWALLS, ETC. (FOR PIPES 48 INCHES & UNDER)

LINE & STATION / SIZE / THICKNESS OR GAUGE	OFFSET	STRUCTURE NUMBER FROM	STRUCTURE NUMBER TO	TOP ELEVATION FT.	INVERT ELEVATION FT.	INVERT ELEVATION FT.	MINIMUM REQUIRED SLOPE %
Y3 19+82	256 LT	1305					
L 137+50	31 RT	1306			806.7	806.3	
L 138+00	25 RT	1401					
L 140+11	23 RT	1402					
SHEET TOTALS							
PROJECT TOTALS							

LINE & STATION	Drainage Pipe (RCP, CSP, CAAP, HDPE, or PVC) 12	15	18	24	30	36	42	48	DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE	DO NOT USE PVC
Y3 19+82													
L 137+50													
L 138+00													
L 140+11													
SHEET TOTALS													
PROJECT TOTALS		676	100	296									

LINE & STATION	R. C. PIPE CLASS III 12	15	18	24	30	36	42	48	R. C. PIPE CLASS IV 12	15	18	24	30	36	42	48
Y3 19+82																
L 137+50											76					
L 138+00																
L 140+11																
SHEET TOTALS											76					
PROJECT TOTALS			384	196	156	104				296	416	168	124			160

LINE & STATION	15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	24" SIDE DRAIN PIPE	ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CY	REINFORCED ENDWALLS CY	DRAINAGE STRUCTURE MASONRY CY	QUANTITIES FOR DRAINAGE STRUCTURES (NOTE: TOTAL LIN. FT. FOR PAY QUANTITY SHALL BE A + (1.3 X B)) 0' THRU 5' EACH	A: 5' THRU 10' LIN. FT.	B: 10' AND ABOVE LIN. FT.	C.B. STD. 840.01 OR STD. 840.02
Y3 19+82	48									
L 137+50										
L 138+00	24									
L 140+11	32									
SHEET TOTALS	104									
PROJECT TOTALS	212			9.400			14	4.1		

LINE & STATION	FRAME, GRATES, AND HOOD STD. 840.03 GRATE TYPE E	F	G		CONCRETE TRANSITIONAL SECTION D.I. STD. 852.04 OR STD. 852.06	C.B. STD. 852.05	OPEN THROAT C.B. STD. 840.04 OR STD. 840.05	CONCRETE BRIDGE APPROACH D.I. STD. 840.13	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME AND GRATES STD. 840.16	G.D.I. TYPE "A" STD. 840.17 OR STD. 840.26	G.D.I. TYPE "B" STD. 840.18 OR STD. 840.27	G.D.I. TYPE "D" STD. 840.19 OR STD. 840.28
Y3 19+82													
L 137+50													
L 138+00													
L 140+11													
SHEET TOTALS													
PROJECT TOTALS												13	

LINE & STATION	G.D.I. (W.S. FLAT) FRAME WITH GRATE STD. 840.20	G.D.I. (W.S. FLAT) FRAME W/ 2 GRATES STD. 840.20	G.D.I. (W.S. SAG) FRAME W/ GRATE STD. 840.22	G.D.I. (W.S. SAG) FRAME W/ 2 GRATES STD. 840.22	G.D.I. (N.S. SAG) FRAME W/ GRATE STD. 840.24	G.D.I. (N.S. SAG) FRAME W/ 2 GRATES STD. 840.24	G.D.I. (N.S. FLAT) FRAME W/ GRATE STD. 840.29	G.D.I. (N.S. FLAT) FRAME W/ 2 GRATES STD. 840.29	FRAME W/ GRATE FOR DRIVEWAY STD. 840.30	J.B. STD. 840.31 OR STD. 840.32	T.B.J.B. STD. 840.34	T.B.D.I. STD. 840.35	T.B.D.I. FOR STEEL GRATES STD. 840.36	STEEL FRAME WITH TWO GRATES STD. 840.37	TEMP STEEL PLATE COVER MASONRY DRAINAGE
Y3 19+82															
L 137+50															
L 138+00															
L 140+11															
SHEET TOTALS															
PROJECT TOTALS						6		7		1					

LINE & STATION	M.H. STD. 840.51, STD. 840.52, OR STD. 840.53	M.H. FRAME AND COVER STD. 840.54	ADJUST D.I.	15" DRAINAGE PIPE ELBOW	18" DRAINAGE PIPE ELBOW	BERM DITCH OUTLET STD. 850.10 (PER EACH)	BERM DITCH OUTLET STD. 850.11 (PER EACH)	PREFORMED SCOUR HOLE (PER EACH)	ENERGY DISSIPATION BASIN	FLOWABLE FILL CY	CONCRETE COLLARS CL. "B" STD. 840.72 CY	CONCRETE AND BRICK PIPE PLUG STD. 840.71 CY	PIPE REMOVAL LIN. FT.	REMARKS
Y3 19+82														
L 137+50													20	
L 138+00													61	
L 140+11													20	
SHEET TOTALS													101	
PROJECT TOTALS		1	1	4	2			1					311	

ABBREVIATIONS

C.A.A.	CORRUGATED ALUMINIUM ALLOY
C.B.	CATCH BASIN
C.S.	CORRUGATED STEEL
D.I.	DROP INLET
G.D.I.	GRATED DROP INLET
H.D.P.E.	HIGH DENSITY POLYETHYLENE
J.B.	JUNCTION BOX
M.H.	MANHOLE
N.S.	NARROW SLOT
P.V.C.	POLYVINYL CHLORIDE
R.C.	REINFORCED CONCRETE
T.B.D.I.	TRAFFIC BEARING DROP INLET
T.B.J.B.	TRAFFIC BEARING JUNCTION BOX
W.S.	WIDE SLOT

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NC10478

COMPUTED BY:	Stacey H. Bailey	DATE:	8/25/2014
CHECKED BY:	Alex D. Snider	DATE:	6/19/2015

PROJECT NO.	SHEET NO.
W-5516	3D-3

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

Note: Invert Elevations indicated are for Bid Purposes only and shall not be used for project construction stakeout.
See "Standard Specifications For Roads and Structures, Section 300-5".

LIST OF PIPES, ENDWALLS, ETC. (FOR PIPES 54 INCHES & OVER)

LINE & STATION / SIZE / THICKNESS OR GAUGE	OFFSET	STRUCTURE NUMBER FROM	STRUCTURE NUMBER TO	TOP ELEVATION FT.	INVERT ELEVATION FT.	INVERT ELEVATION FT.	MINIMUM REQUIRED SLOPE %	Drainage Pipe (RCP, CSP, CAAP, HDPE, or PVC) 54	60	66	72	78	84		DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE	DO NOT USE PVC
L 108+55	37 LT	1101																	
		1101	1102		737.8	735.0													
SHEET TOTALS																			
PROJECT TOTALS																			

LINE & STATION	R. C. PIPE CLASS III 54	60	66	72	78	84		R. C. PIPE CLASS IV 54	60	66	72	78	84		ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CY	72" PIPE REINFORCED ENDWALLS STD. 838.39 OR STD. 838.69 OR STD. 838.80 CY	DRAINAGE STRUCTURE MASONRY CY	QUANTITIES FOR DRAINAGE STRUCTURES (NOTE: TOTAL LIN. FT. FOR PAY QUANTITY SHALL BE A + (1.3 X B)) 0' THRU 5' EACH	A 5' THRU 10' LIN. FT.	B 10' AND ABOVE LIN. FT.	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STD. 840.03 GRATE TYPE E	F	G		CONCRETE TRANSITIONAL SECTION D.I. STD. 852.04 OR STD. 852.06	C.B. STD. 852.05
L 108+55																7.500											
				84																							
SHEET TOTALS				84												7.500											
PROJECT TOTALS				84												7.500											

LINE & STATION	OPEN THROAT C.B. STD. 840.04 OR STD. 840.05	CONCRETE BRIDGE APPROACH D.I. STD. 840.13	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME AND GRATES STD. 840.16	G.D.I. TYPE "A" STD. 840.17 OR STD. 840.26	G.D.I. TYPE "B" STD. 840.18 OR STD. 840.27	G.D.I. TYPE "D" STD. 840.19 OR STD. 840.28	G.D.I. (W.S. FLAT) FRAME WITH GRATE STD. 840.20	G.D.I. (W.S. FLAT) FRAME W/ 2 GRATES STD. 840.20	G.D.I. (W.S. SAG) FRAME W/ GRATE STD. 840.22	G.D.I. (W.S. SAG) FRAME W/ 2 GRATES STD. 840.22	G.D.I. (N.S. SAG) FRAME W/ GRATE STD. 840.24	G.D.I. (N.S. SAG) FRAME W/ 2 GRATES STD. 840.24	G.D.I. (N.S. FLAT) FRAME W/ GRATE STD. 840.29	G.D.I. (N.S. FLAT) FRAME W/ 2 GRATES STD. 840.29	DRIVEWAY D.I. STD. 840.30	FRAME W/ GRATE FOR DRIVEWAY STD. 840.30	J.B. STD. 840.31 OR STD. 840.32	ANGLED VANE GRATES AND FRAMES STD. 840.33	T.B.J.B. STD. 840.34	T.B.D.I. STD. 840.35	T.B.D.I. FOR STEEL GRATES STD. 840.36	STEEL FRAME WITH TWO GRATES STD. 840.37	TEMP STEEL PLATE COVER MASONRY DRAINAGE	M.H. STD. 840.51, STD. 840.52, OR STD. 840.53	M.H. FRAME AND COVER STD. 840.54	CONVERT EXISTING C.B. TO J.B.	CONVERT EXISTING C.B. TO D.I.	CONVERT EXISTING D.I. TO J.B.	CONVERT EXISTING J.B. TO D.I.	ADJUST C.B.	ADJUST D.I.	##" DRAINAGE PIPE ELBOW	##" DRAINAGE PIPE ELBOW	##" DRAINAGE PIPE ELBOW	ENERGY DISSIPATION BASIN		FLOWABLE FILL CY	CONCRETE COLLARS CL. "B" STD. 840.72 CY	CONCRETE AND BRICK PIPE PLUG STD. 840.71 CY	PIPE REMOVAL LIN. FT.	REMARKS
L 108+55																																										
SHEET TOTALS																																										
PROJECT TOTALS																																										

ABBREVIATIONS

C.A.A.	CORRUGATED ALUMINIUM ALLOY
C.B.	CATCH BASIN
C.S.	CORRUGATED STEEL
D.I.	DROP INLET
G.D.I.	GRATED DROP INLET
H.D.P.E.	HIGH DENSITY POLYETHYLENE
J.B.	JUNCTION BOX
M.H.	MANHOLE
N.S.	NARROW SLOT
P.V.C.	POLYVINYL CHLORIDE
R.C.	REINFORCED CONCRETE
T.B.D.I.	TRAFFIC BEARING DROP INLET
T.B.J.B.	TRAFFIC BEARING JUNCTION BOX
W.S.	WIDE SLOT

COMPUTED BY: ADS DATE: 7-20-2015
CHECKED BY: DCW DATE: 7-20-2015

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

ICA Engineering
5121 Kingdom Way,
Suite 100
Raleigh, NC 27607
NC License No: F-0258

PROJECT REFERENCE NO.	SHEET NO.
W-5516	3G-1

SUMMARY OF UNDERCUT

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	CY
-L-	73+50	74+00	LT./RT.	50
-L-	134+00	139+00	LT./RT.	1,550
CONTINGENCY (GEOTECH)				350
			TOTAL:	1,950

SUMMARY OF SUBSURFACE DRAINAGE

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	DRAIN TYPE UD/BD/SD	LF
CONTINGENCY				UD	500
				TOTAL LF:	500

*UD = UNDER DRAIN
*BD = BLIND DRAIN
*SD = SUBSURFACE DRAIN

SUMMARY OF SHALLOW UNDERCUT

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	CY
	CONTINGENCY			150
			TOTAL:	150

SUMMARY OF GEOTEXTILE FOR SOIL STABILIZATION

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	SY
	CONTINGENCY			650
-L-	73+50	74+00		50
-L-	134+00	139+00		1,550
			TOTAL:	2,250

THIS QUANTITY MAY NOT INCLUDE ALL OF THE GEOTEXTILE FOR SOIL STABILIZATION FOR THE ENTIRE PROJECT.

SUMMARY OF CL IV SUBGRADE STABILIZATION

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	TON
	CONTINGENCY			300
			TOTAL:	300

SUMMARY OF SELECT GRANULAR MATERIAL

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	CY
	CONTINGENCY			300
			TOTAL:	300

SUMMARY OF BRIDGE WAITING PERIODS

BRIDGE DESCRIPTION	END BENT NO.	MONTHS
BRIDGE NO. 65 OVER I-85 AND COLD WATER CREEK ON SR 1210	1	1

7/20/2015
R:\Roadway\Proj\w5516_rdy_sum.dgn
ICA ENGINEERING, INC.

6/4/99

COMPUTED BY: MAY DATE: 7-18-2012
CHECKED BY: _____ DATE: _____

PROJECT REFERENCE NO.	SHEET NO.
W-5516	3P-1

PARCEL INDEX SHEET

PARCEL NO.	SHEET NO.	PROPERTY OWNERS NAMES
1	4	JOYCE D. DEAL
2	4,5	ANNIE R. MORGAN
3	5	LANDIS CHURCH OF GOD
4	5,6	GARY'S BARBQUE INC.
5	6	JOHN H. GREENLAND
6	6	EUGENE O. & IRENE MOOSE
7	6,7	DAVID W. & MARY Q. MOOSE
8	6,7	EUGENE O. & IRENE MOOSE
9	7,8,9,10,11,12	HIGH BRIDGE, LLC
10	11,12,13	MARK A. & JOY L. ROBERTS
11	12	TRACY P. & JONATHAN O. EDDY
12	12	JOHN T. & FAITH A. LIGHTFOOT
13	12,13	SCOTT H. & ASHLEIGH H. KILPATRICK
14	11,12,13	TERRY O. BASINGER
15	13	LARRY W. & BARBARA B. BASINGER
16	11,12,13	LARRY W. & BARBARA B. BASINGER
17	11,12,13	NORMAN R. BASINGER
18	13,14	JAMES F. & TERA H. CARTER
19	14	WESLEY D. & KIMBERLY W. HOYLE
20	14	LARMAD INC.
21	13,14	JERRY & TONYA BARRINGER
* 22	14	(COMBINED WITH PARCEL 18)
23	14	SHEA CASTLEBROOK, LLC
24	2B–1	CHARLES RAY RYMER
25	2B–2	RALPH E. ARCHIE, TRUSTEE

7/6/2015
N:\roadway\Proj\w5516-rdy-parcel_index-3P-1.dgn
File: ENGINEERING, INC.

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5/14/99

NAD 83/NSRS 2007

ICA Engineering
5121 Kingdom Way, Suite 100
Raleigh, NC 27607
NC License No: F-0258

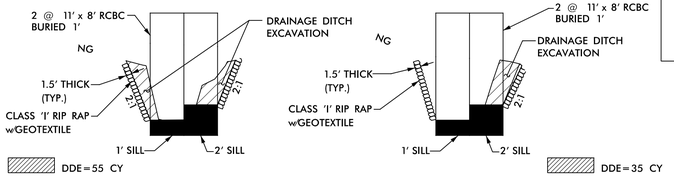
PROJECT REFERENCE NO.	SHEET NO.
W-5516	5
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 22606 ENGINEER DAVID C. WALLER

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 24451 ENGINEER STACEY H. BAILEY

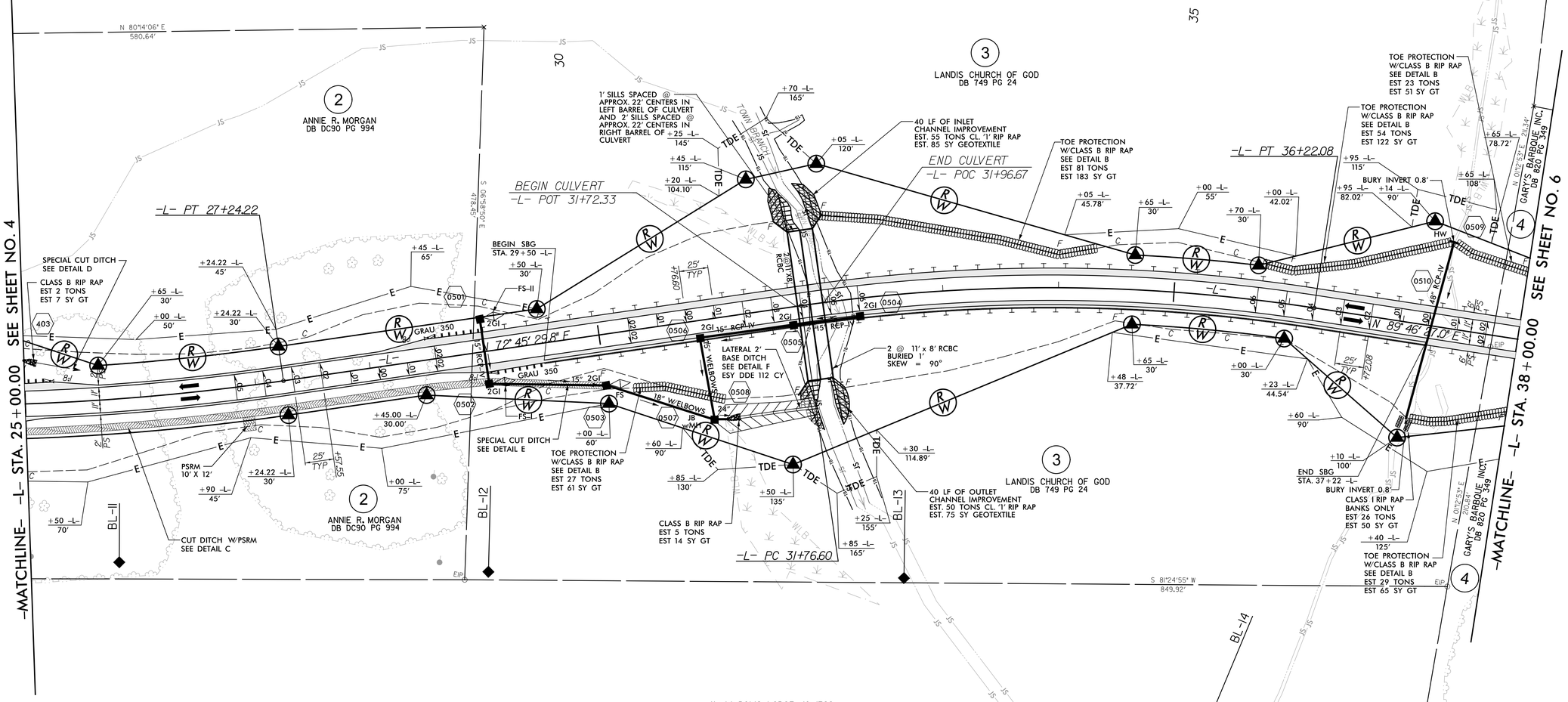
DocuSigned by: David C. Waller 7/21/2015
89AD3F71560C5435...

DocuSigned by: Stacey H Bailey 7/21/2015
CB5696BC59E046E...



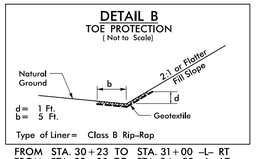
OUTLET CHANNEL
(LOOKING DOWNSTREAM)
(NOT TO SCALE)

INLET CHANNEL
(LOOKING DOWNSTREAM)
(NOT TO SCALE)



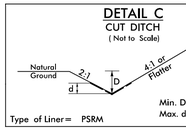
-L-	
PI Sta 22+94.13	PI Sta 34+00.99
△ = 24° 32' 30.2" (LT)	△ = 17° 00' 57.2" (RT)
D = 2° 48' 31.0"	D = 3° 49' 11.0"
L = 873.80'	L = 445.48'
T = 443.71'	T = 224.39'
R = 2,040.00'	R = 1,500.00'
SE = .05	SE = .06
DS = 50 MPH	DS = 50 MPH

DETAIL B
TOE PROTECTION
(Not to Scale)



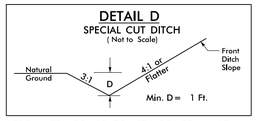
FROM STA. 30+23 TO STA. 31+00 -L- RT
FROM STA. 32+00 TO STA. 34+32 -L- LT
FROM STA. 35+75 TO STA. 37+30 -L- LT
FROM STA. 37+35 TO STA. 38+00 -L- LT
FROM STA. 37+18 TO STA. 38+00 -L- RT

DETAIL C
CUT DITCH
(Not to Scale)



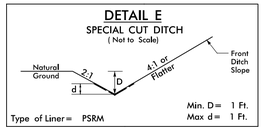
FROM STA. 25+00 TO STA. 29+00 -L- RT

DETAIL D
SPECIAL CUT DITCH
(Not to Scale)



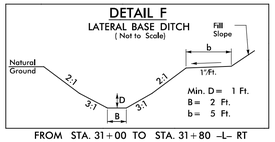
FROM STA. 25+00 TO STA. 25+50 -L- LT

DETAIL E
SPECIAL CUT DITCH
(Not to Scale)



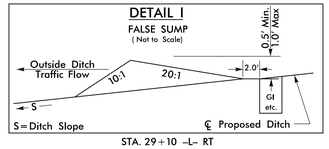
FROM STA. 29+00 TO STA. 30+00 -L- RT

DETAIL F
LATERAL BASE DITCH
(Not to Scale)



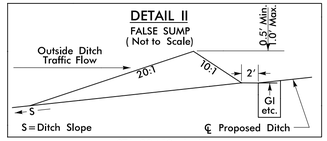
FROM STA. 31+00 TO STA. 31+80 -L- RT

DETAIL I
FALSE SUMP
(Not to Scale)



STA. 29+10 -L- RT

DETAIL II
FALSE SUMP
(Not to Scale)



STA. 29+10 -L- LT

FOR -L- PROFILE, SEE SHEET 15

7/20/2015
ICA ENGINEERING, INC.
R:\Projects\W-5516_rdy_psh_05.dgn

DocuSign Envelope ID: DF0B60F5-0122-47CE-833E-256B7CB80CE6

PROJECT REFERENCE NO.	SHEET NO.
W-5516	6
RW SHEET NO.	

ICA Engineering
5121 Kingdom Way, Suite 100
Raleigh, NC 27607
NC License No: F-0258

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 22606 ENGINEER DAVID C. WALLER
DocuSigned by: David C. Waller 6/25/2015

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 24451 ENGINEER STACEY H. BAILEY
DocuSigned by: Stacey H. Bailey 6/25/2015

-Y2-

PI Sta 10+98.27	PI Sta 13+01.30	PI Sta 17+35.61
Δ = 2° 45' 10.3" (LT)	Δ = 5° 59' 55.2" (LT)	Δ = 0° 10' 26.2" (RT)
D = 1° 24' 03.1"	D = 2° 51' 53.2"	D = 0° 11' 51.3"
L = 196.51'	L = 209.39'	L = 88.04'
T = 98.27'	T = 104.79'	T = 44.02'
R = 4,090.00'	R = 2,000.00'	R = 29,000.00'
	SE = .05	SE = NC

FOR -L- PROFILE, SEE SHEET 16
FOR -Y2- PROFILE, SEE SHEET 21

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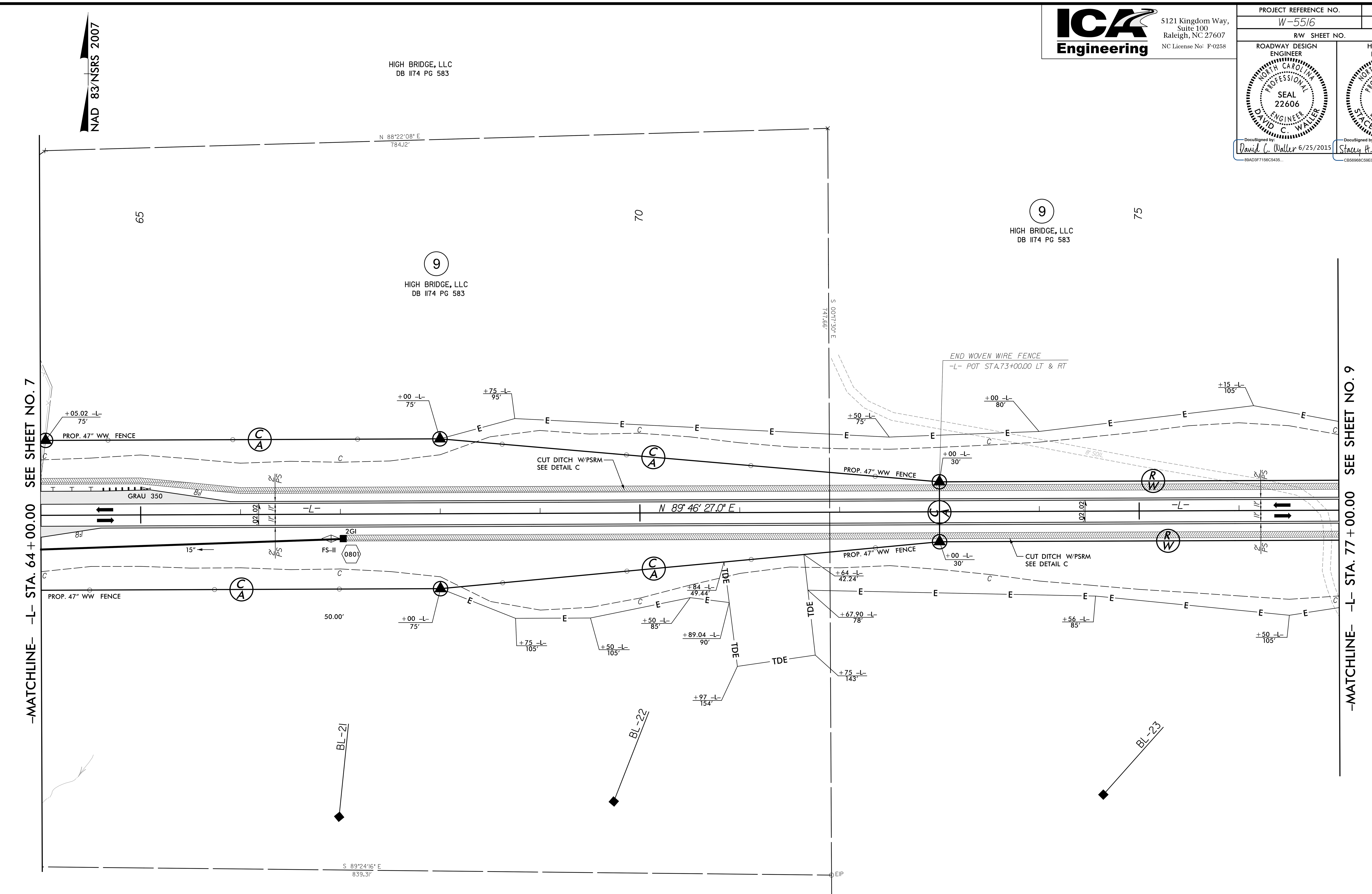
5121 Kingdom Way, Suite 100
Raleigh, NC 27607
NC License No: F-0258

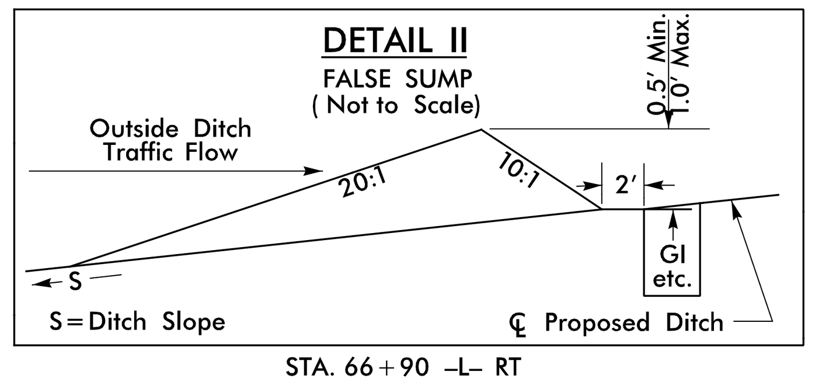
PROJECT REFERENCE NO.	SHEET NO.
W-5516	8

RW SHEET NO.

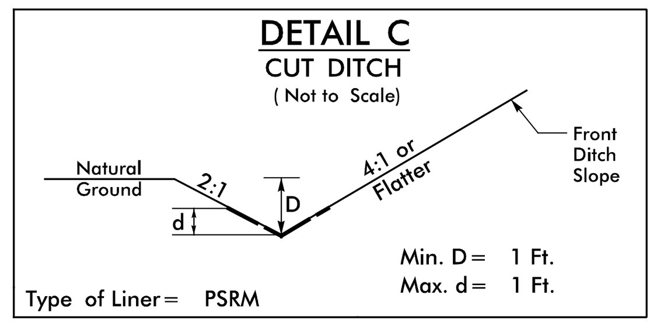
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 22606 ENGINEER DAVID C. WALLER	NORTH CAROLINA PROFESSIONAL SEAL 24451 ENGINEER STACEY H. BAILEY
DocuSigned by: David C. Waller 6/25/2015	DocuSigned by: Stacey H. Bailey 6/25/2015



HIGH BRIDGE, LLC
DB 1174 PG 583



STA. 66+90 -L- RT



FROM STA. 63+50 TO STA. 77+50 -L- LT
FROM STA. 67+00 TO STA. 77+50 -L- RT

FOR -L- PROFILE, SEE SHEET 17

6/25/2015
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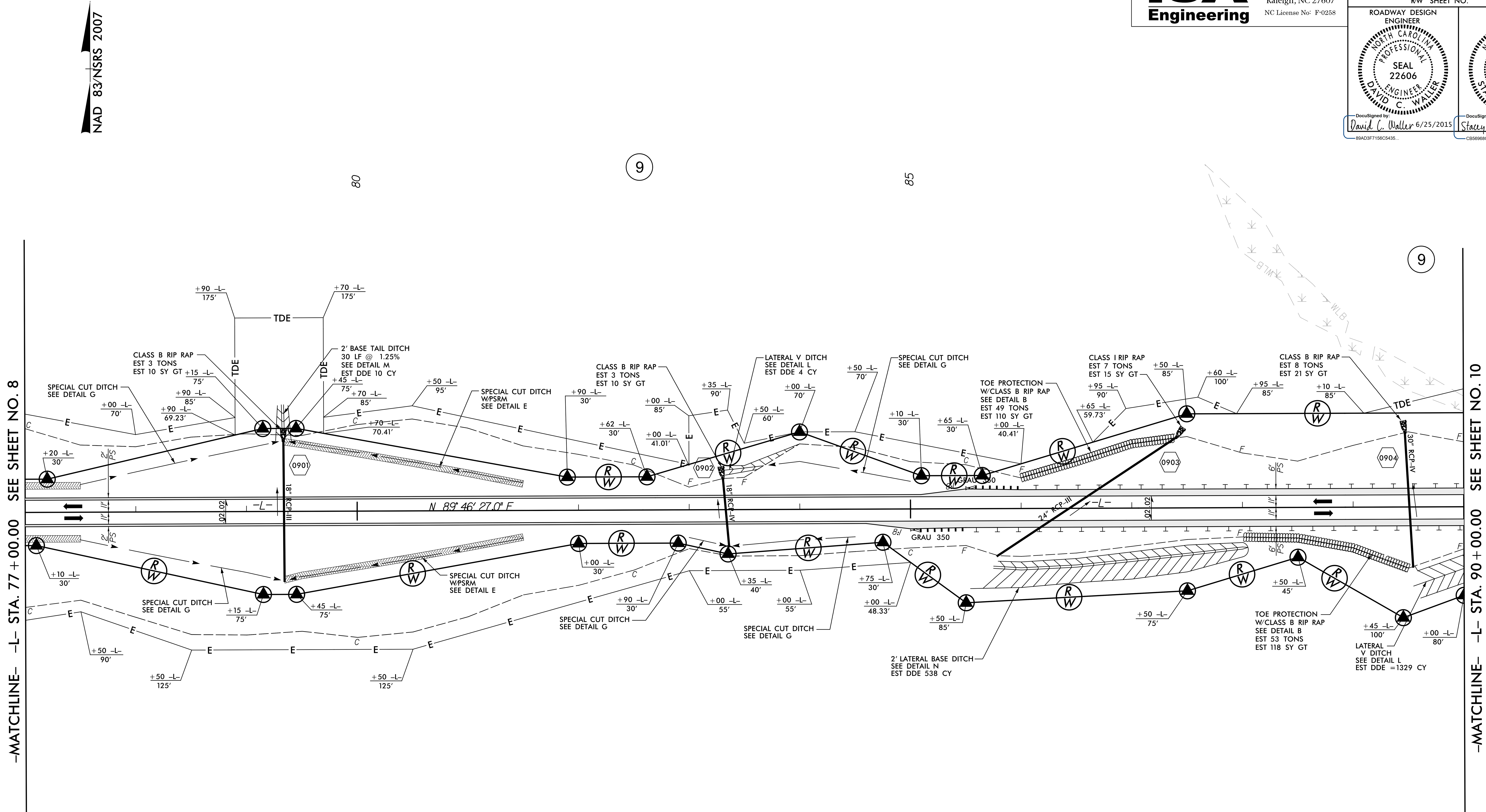
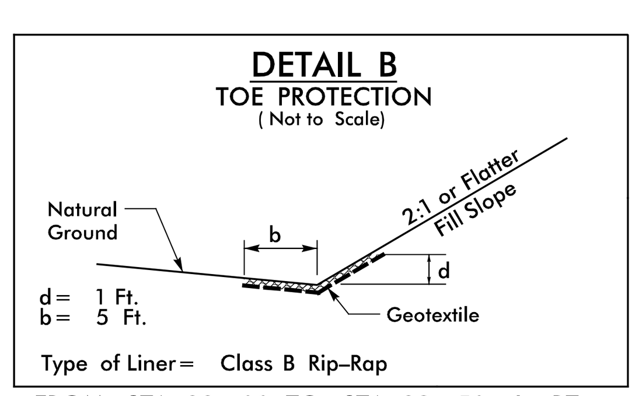
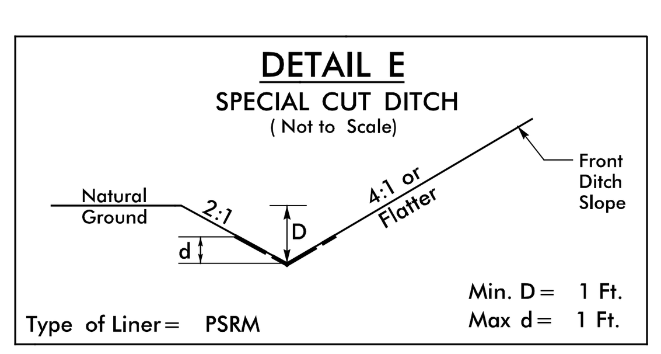
PROJECT REFERENCE NO.	SHEET NO.
W-5516	9
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 22606 ENGINEER DAVID C. WALLER	NORTH CAROLINA PROFESSIONAL SEAL 24451 ENGINEER STACEY H. BAILEY
DocuSigned by: David C. Waller 6/25/2015	DocuSigned by: Stacey H. Bailey 6/25/2015

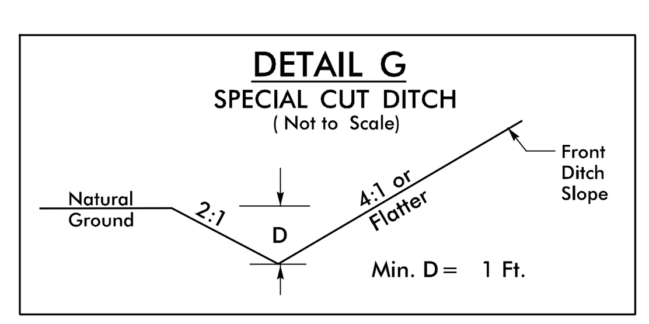




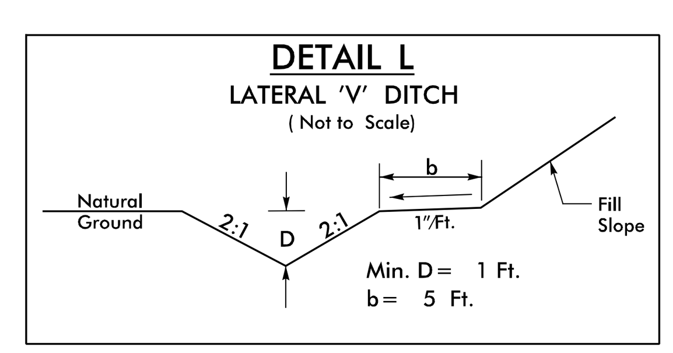
FROM STA. 88+00 TO STA. 89+50 -L- RT
FROM STA. 86+00 TO STA. 87+40 -L- LT



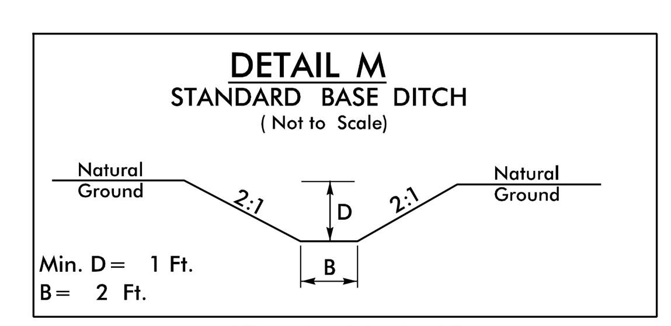
FROM STA. 79+34 TO STA. 81+50 -L- LT
FROM STA. 79+34 TO STA. 81+50 -L- RT



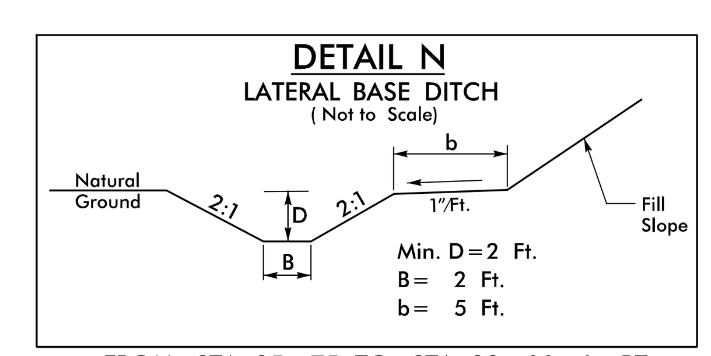
FROM STA. 77+50 TO STA. 79+34 -L- RT
FROM STA. 77+50 TO STA. 79+34 -L- LT
FROM STA. 83+00 TO STA. 83+36 -L- RT
FROM STA. 83+36 TO STA. 84+50 -L- LT
FROM STA. 84+00 TO STA. 85+00 -L- RT



FROM STA. 83+30 TO STA. 84+00 -L- LT
FROM STA. 89+54 TO STA. 90+00 -L- RT



STA. 79+34 -L- LT



FROM STA. 85+75 TO STA. 88+00 -L- RT

FOR -L- PROFILE, SEE SHEET 17

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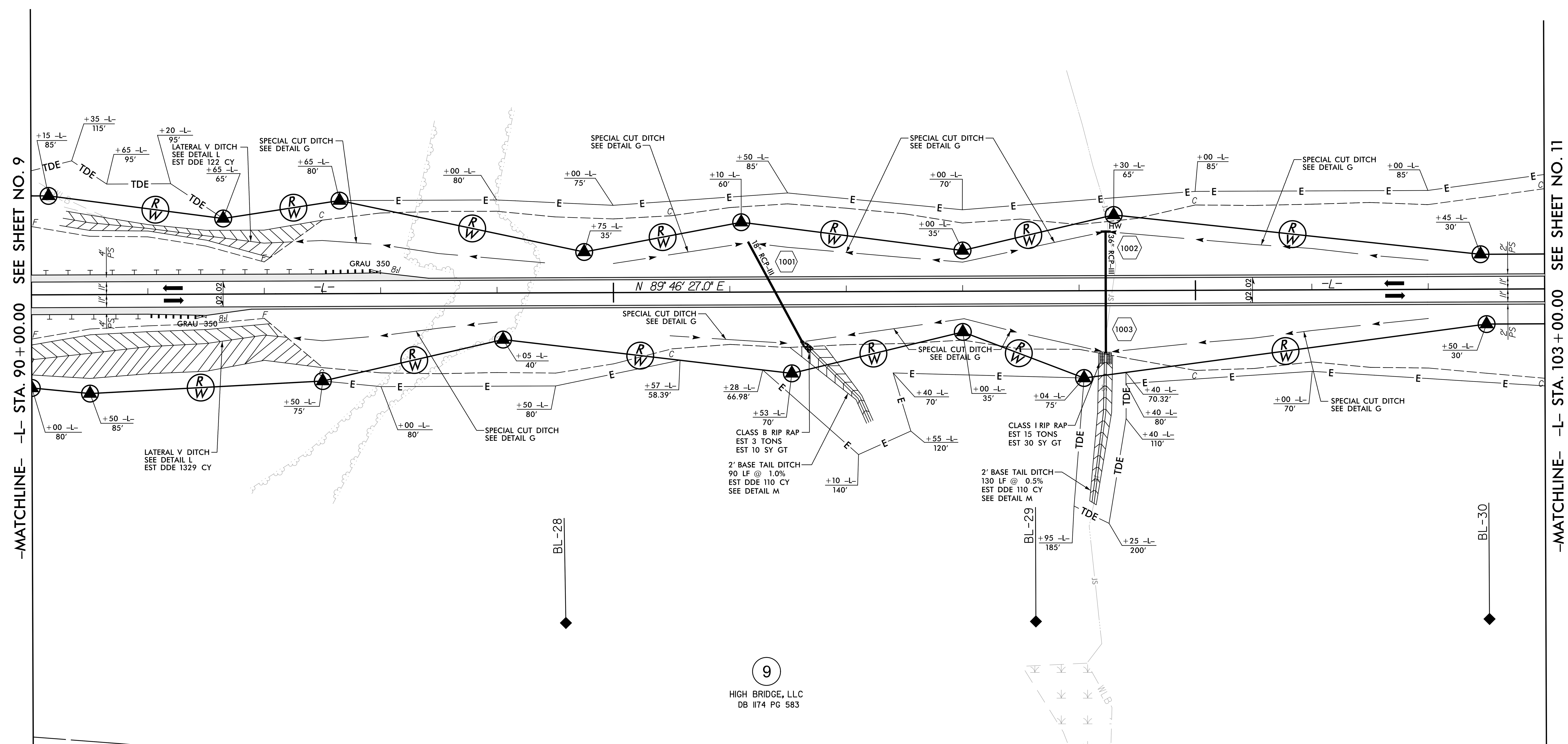
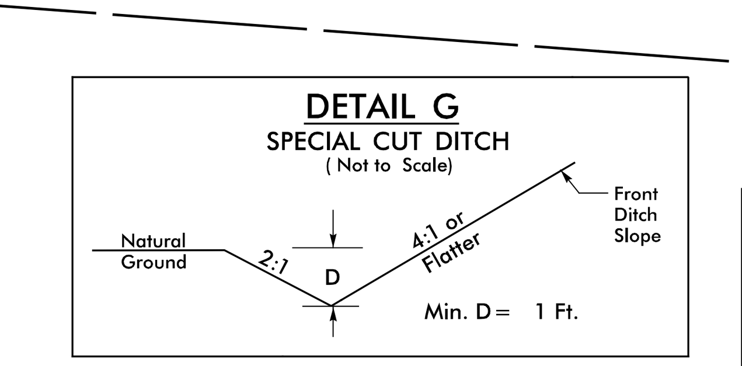
5121 Kingdom Way, Suite 100
Raleigh, NC 27607
NC License No: F-0258

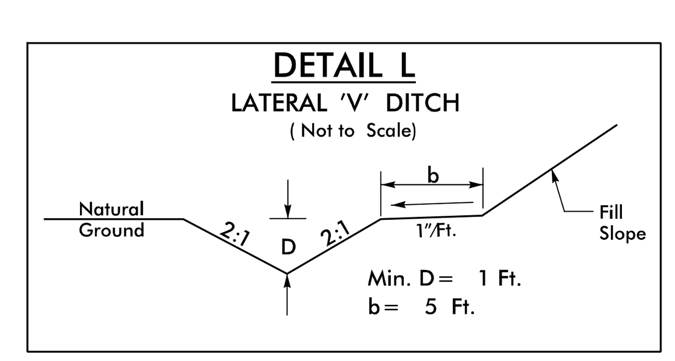
PROJECT REFERENCE NO.	SHEET NO.
W-5516	10
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 22606 ENGINEER DAVID C. WALLER	NORTH CAROLINA PROFESSIONAL SEAL 24451 ENGINEER STACEY H. BAILEY
DocuSigned by: David C. Waller 6/25/2015	DocuSigned by: Stacey H. Bailey 6/25/2015

NAD 83/NSRS 2007

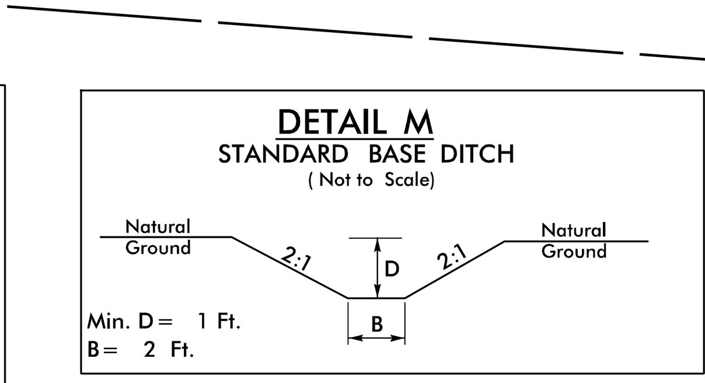




FROM STA. 92+00 TO STA. 94+50 -L- LT
FROM STA. 92+00 TO STA. 94+00 -L- RT
FROM STA. 95+00 TO STA. 96+12 -L- LT
FROM STA. 95+50 TO STA. 96+65 -L- RT
FROM STA. 96+12 TO STA. 98+00 -L- LT
FROM STA. 96+65 TO STA. 98+00 -L- RT
FROM STA. 98+00 TO STA. 99+23 -L- LT
FROM STA. 98+00 TO STA. 99+23 -L- RT
FROM STA. 99+23 TO STA. 102+50 -L- LT
FROM STA. 99+23 TO STA. 102+00 -L- RT



FROM STA. 90+00 TO STA. 92+00 -L- RT
FROM STA. 90+25 TO STA. 92+00 -L- LT



STA. 96+65 -L- RT
STA. 99+23 -L- RT

FOR -L- PROFILE, SEE SHEET 18

6/25/2015
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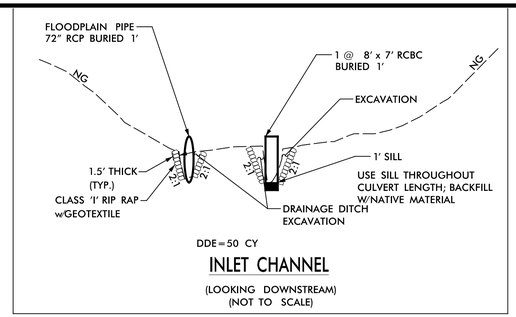
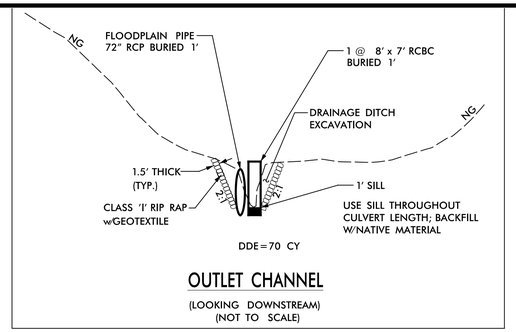
NAD 83/NSRS 2007



INLET CHANNEL

(LOOKING DOWNSTREAM)
(NOT TO SCALE)



OUTLET CHANNEL

(LOOKING DOWNSTREAM)
(NOT TO SCALE)

ICA Engineering
5121 Kingdom Way,
Suite 100
Raleigh, NC 27607
NC License No: F-0258

PROJECT REFERENCE NO.	SHEET NO.
W-5516	11
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 22606 ENGINEER DAVID C. WALLER
DocuSigned by: David C. Waller 7/21/2015
89AD3F7156C5435...

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 24451 ENGINEER STACEY H. BAILEY
DocuSigned by: Stacey H Bailey 7/21/2015
CB56968C59E046E...

105 110 115

9 HIGH BRIDGE, LLC DB 1174 PG 583

-MATCHLINE- -L- STA. 103+00.00 SEE SHEET NO. 10

-MATCHLINE- -L- STA. 116+00.00 SEE SHEET NO. 12

LATERAL V DITCH W/CLASS B RIP RAP SEE DETAIL A EST 31 TONS EST 72 SY GT EST DDE 94 CY

15 LF OF INLET CHANNEL IMPROVEMENT EST. 10 TONS CL. 'I' RIP RAP EST. 15 SY GEOTEXTILE

1' SILLS SPACED APPROX. 20' CENTERS

20 LF OF INLET CHANNEL IMPROVEMENT EST. 10 TONS CL. 'I' RIP RAP EST. 15 SY GEOTEXTILE

LATERAL V DITCH W/CLASS B RIP RAP SEE DETAIL A EST 20 TONS EST 47 SY GT EST DDE 221 CY

SPECIAL CUT DITCH W/PSRM SEE DETAIL E

1 @ 8' x 7' RCBC BURIED 1' SKEW = 81

GRAU 350

N 89° 46' 27.0" E

N 86°37'01" W 390.30'

N 86°37'01" W 4.34'

LATERAL V DITCH W/CLASS B RIP RAP SEE DETAIL A EST 34 TONS EST 79 SY GT EST DDE 163 CY

TDE

FLOODPLAIN PIPE ID STATION 108+55.3 72" RCP-III BURIED 1' LENGTH 83.9'± SKEW = 114

LATERAL V DITCH W/CLASS B RIP RAP SEE DETAIL A EST 19 TONS EST 44 SY GT EST DDE 70 CY

20 LF OF OUTLET CHANNEL IMPROVEMENT EST. 15 TONS CL. 'I' RIP RAP EST. 25 SY GEOTEXTILE

BL-31 BL-32 BL-33 BL-34

9 HIGH BRIDGE, LLC DB 1174 PG 583

10 MARK A. & JOY L. ROBERTS DB 581PG 480

14 TERRY O. BASINGER DB 581PG 481

16 LARRY W. & BARBARA B. BASINGER DB 1075 PG 796

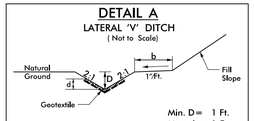
17 NORMAN R. BASINGER DB 564 PG 637

S 08°16'49" W 155.47'

S 08°10'18" W 155.94'

S 08°15'25" W 146.13'

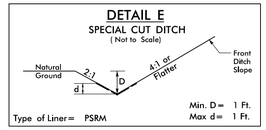
DETAIL A
LATERAL 'V' DITCH
(Not to Scale)



Min. D= 1 Ft.
Max. d= 1 Ft.
b=5 Ft.
Type of Liner= Class B Rip-Rap

FROM STA. 106+50 TO STA. 108+04 -L- LT
FROM STA. 106+50 TO STA. 108+20 -L- RT
FROM STA. 108+23 TO STA. 109+17 -L- RT
FROM STA. 109+00 TO STA. 110+00 -L- LT

DETAIL E
SPECIAL CUT DITCH
(Not to Scale)



Min. D= 1 Ft.
Max. d= 1 Ft.
Type of Liner= PSRM

FROM STA. 109+50 TO STA. 110+50 -L- RT
FROM STA. 110+00 TO STA. 111+50 -L- LT

FOR -L- PROFILE, SEE SHEET 18

7/20/2015
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ICA ENGINEERING, INC.

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NAD 83/NSRS 2007

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5121 Kingdom Way, Suite 100
Raleigh, NC 27607
NC License No: F-0258

PROJECT REFERENCE NO.	SHEET NO.
W-5516	12
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 22606 ENGINEER DAVID C. WALLER
DocuSigned by: David C. Waller 7/28/2015

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 24451 ENGINEER STACEY H. BAILEY
DocuSigned by: Stacey H Bailey 7/28/2015

-MATCHLINE- -L- STA. 116+00.00 SEE SHEET NO. 11

-MATCHLINE- -L- STA. 129+00.00 SEE SHEET NO. 13

9
HIGH BRIDGE, LLC
DB 1174 PG 583

11
LISA G. SPRATLING, SEPARATED
DB 1254 PG 39
PB 9995 PG 5886

12
JOHN T. & FAITH A. LIGHTFOOT
DB 1079 PG 534
PB 9995 PG 5896

13
SCOTT H. & ASHLEIGH H. KIRKPATRICK
DB 1042 PG 26

10
MARK A. & JOY L. ROBERTS
DB 581PG 480

14
TERRY O. BASINGER
DB 581PG 481

16
LARRY W. & BARBARA B. BASINGER
DB 1075 PG 796

17
NORMAN R. BASINGER
DB 564 PG 637

S 79°59'07" E 124.87'
N 09°32'06" E 569.38'
S 09°39'00" W 530.05'
S 02°59'00" W 616.54'
N 89°46'27.0" E
N 86°37'28" W 104.14'
N 86°42'34" W 234.96'
N 86°42'34" W 428.68'
S 86°43'28" E 2134.60'
S 86°43'38" E 269.75'
S 86°42'54" E 2204.61'

2SBKD
CONC POOL

CLASS B RIP RAP
EST 3 TONS
EST 10 SY GT

SPECIAL CUT DITCH
SEE DETAIL G

15' ACCESS EASEMENT

BL-35
BL-36

-L- PC 125+84.38

DETAIL G
SPECIAL CUT DITCH
(Not to Scale)
Natural Ground
2:1
D
4:1 or Flatter
Front Ditch Slope
Min. D= 1 Ft.

FROM STA. 122+50 TO STA. 124+10 -L- RT
FROM STA. 124+10 TO STA. 126+50 -L- RT
FROM STA. 128+00 TO STA. 129+00 -L- LT

-L-
PI Sta 133+40.55
Δ = 80° 04' 24.5" (RT)
D = 6° 21' 58.3"
L = 1,257.79'
T = 756.17'
R = 900.00'
SE = .06
DS = 50 MPH

FOR -L- PROFILE, SEE SHEET 19

7/28/2015
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ICA ENGINEERING, INC.

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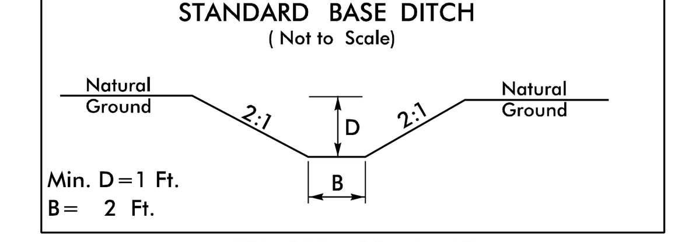
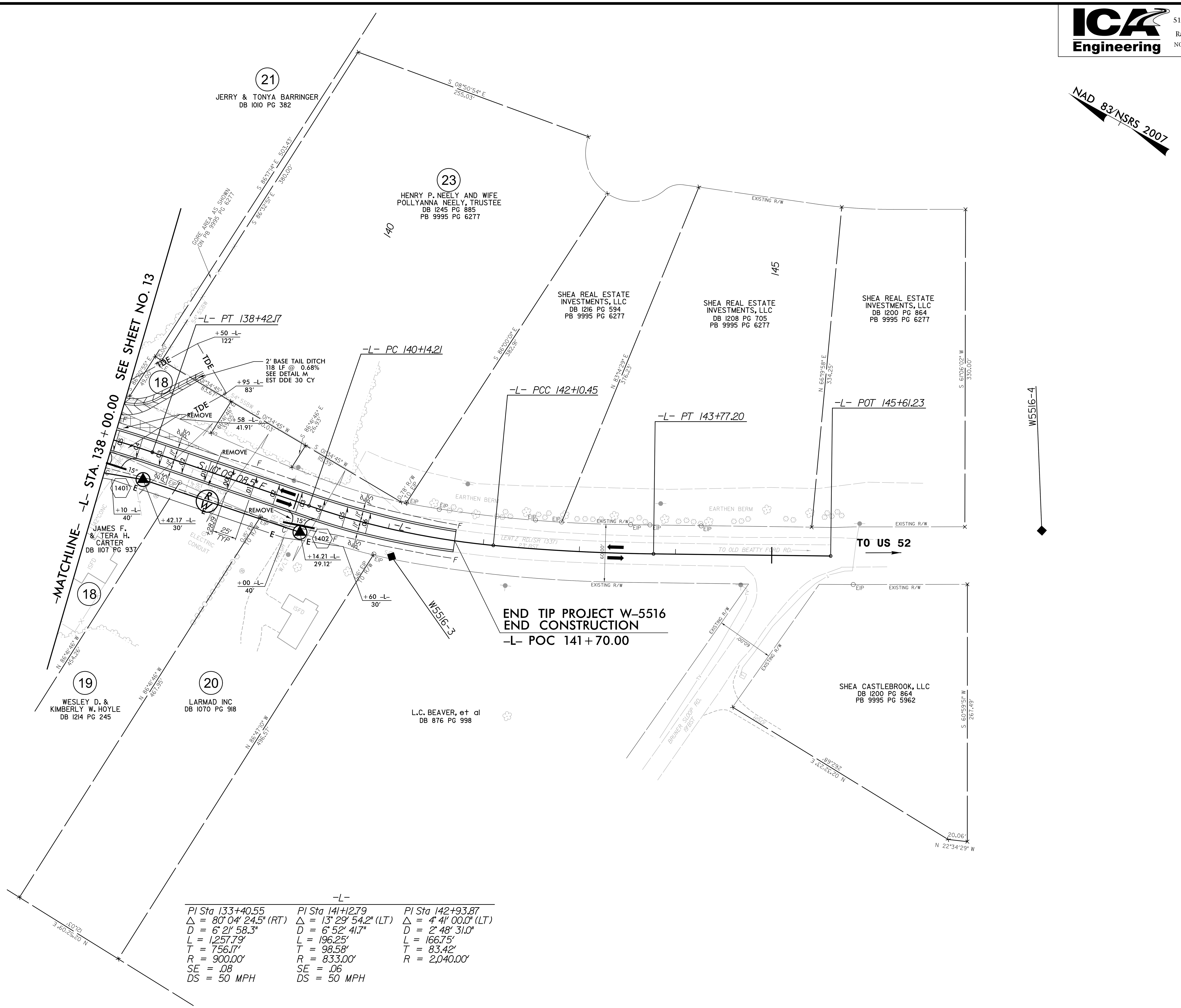
Raleigh, NC 27607
NC License No: F-0258

PROJECT REFERENCE NO.	SHEET NO.
W-5516	14
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 22606 ENGINEER DAVID C. WALLER — David C. Waller 7/28/2015	NORTH CAROLINA PROFESSIONAL SEAL 24451 ENGINEER STACEY H. BAILEY — Stacey H Bailey 7/28/2015





-L-

PI Sta 133+40.55	PI Sta 141+12.79	PI Sta 142+93.87
Δ = 80° 04' 24.5" (RT)	Δ = 13° 29' 54.2" (LT)	Δ = 4° 41' 00.0" (LT)
D = 6° 21' 58.3"	D = 6° 52' 41.7"	D = 2° 48' 31.0"
L = 1,257.79'	L = 196.25'	L = 166.75'
T = 756.17'	T = 98.58'	T = 83.42'
R = 900.00'	R = 833.00'	R = 2,040.00'
SE = .08	SE = .06	
DS = 50 MPH	DS = 50 MPH	

PAVEMENT REMOVAL

FOR -L- PROFILE, SEE SHEET 20

DocuSign Envelope ID: 8F19B692-CAB8-4075-81C9-55A27B5705DB

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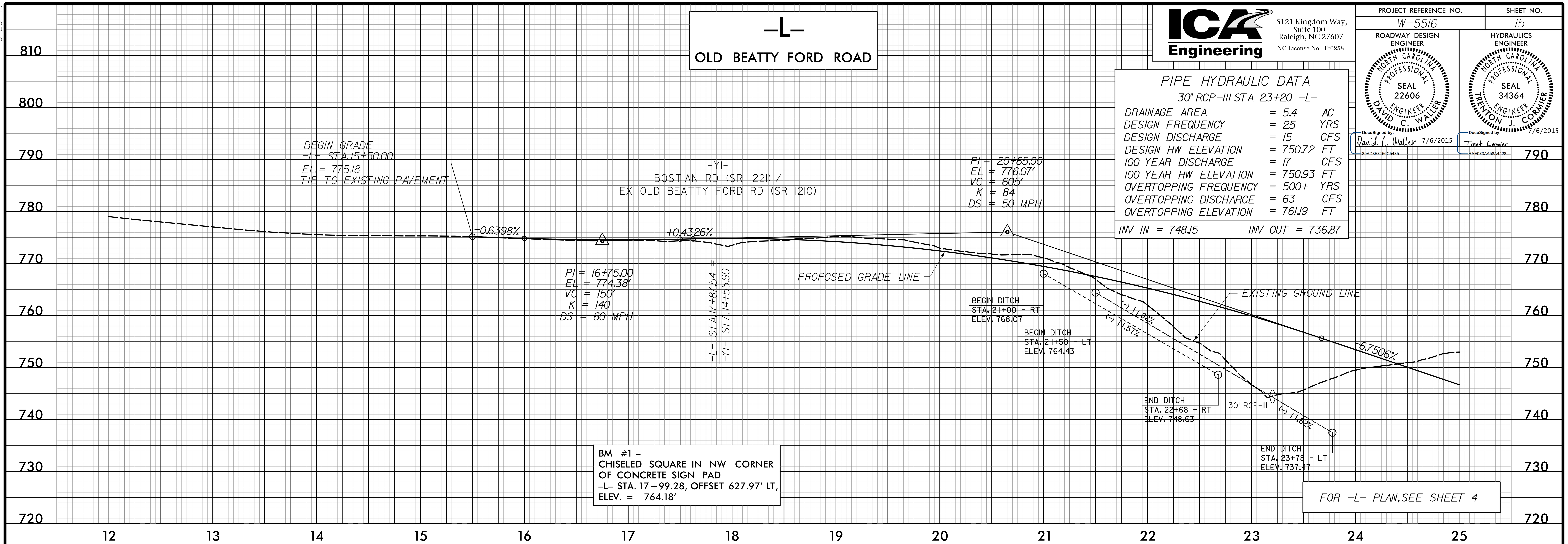
5121 Kingdom Way, Suite 100
Raleigh, NC 27607
NC License No: F-0258

PROJECT REFERENCE NO.	SHEET NO.
W-5516	15

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 22606 DAVID C. WALLER — DocuSigned by: David C. Waller 7/6/2015 — 89AD3F7156C5435...

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 34364 TRENTON J. CORMIER — DocuSigned by: Trent Cormier 7/6/2015 — BAE073AA58A4428...



PIPE HYDRAULIC DATA
30" RCP-III STA 23+20 -L-

DRAINAGE AREA	= 5.4	AC
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 15	CFS
DESIGN HW ELEVATION	= 750.72	FT
100 YEAR DISCHARGE	= 17	CFS
100 YEAR HW ELEVATION	= 750.93	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 63	CFS
OVERTOPPING ELEVATION	= 761.19	FT

INV IN = 748.15 INV OUT = 736.87

CULVERT HYDRAULIC DATA

DRAINAGE AREA	= 1.3	SQ MI
DESIGN DISCHARGE	= 1000	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 698.2	FT
BASE DISCHARGE	= 1100	CFS
BASE HW ELEVATION	= 698.82	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 4700	CFS
OVERTOPPING ELEVATION	= 724.0	FT

PIPE HYDRAULIC DATA
48" RCP-III STA 37+25 -L-

DRAINAGE AREA	= 16.48	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 60	CFS
DESIGN HW ELEVATION	= 719.87	FT
100 YEAR DISCHARGE	= 70	CFS
100 YEAR HW ELEVATION	= 720.32	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 185	CFS
OVERTOPPING ELEVATION	= 730.29	FT

INV IN = 715.52 INV OUT = 706.73

5/28/99
7/6/2015
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ICA ENGINEERING INC

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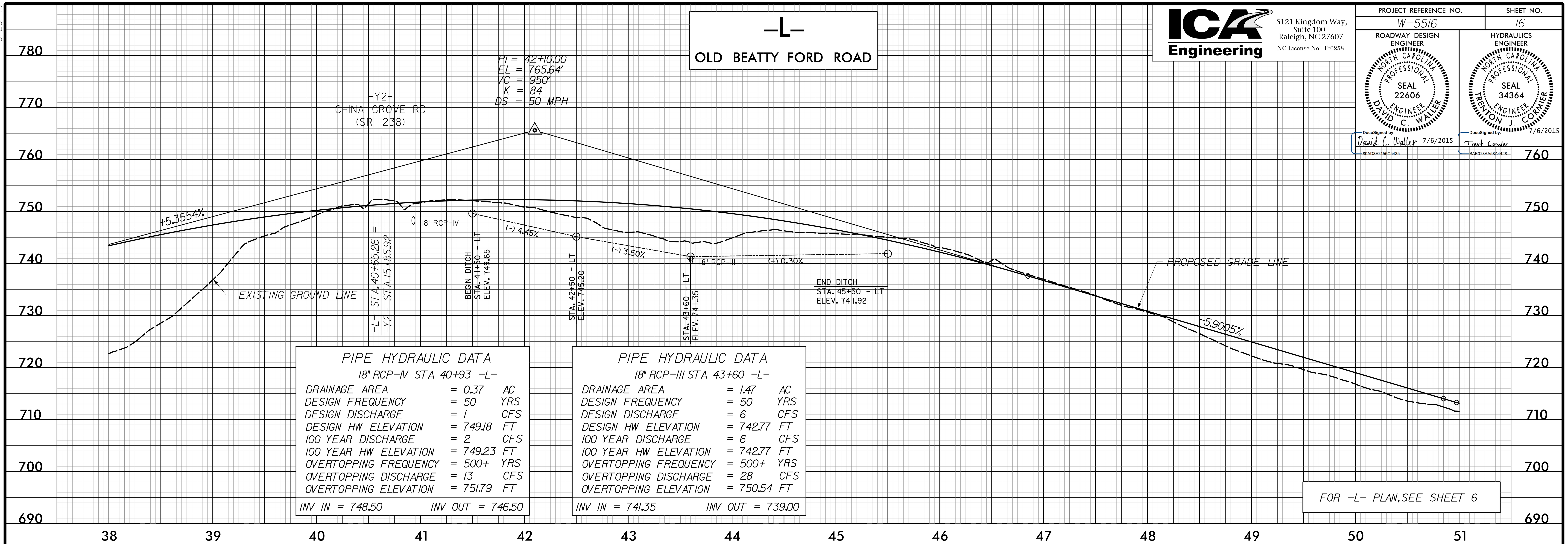
Raleigh, NC 27607
NC License No: F-0258

PROJECT REFERENCE NO.	SHEET NO.
W-5516	16

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 22606 ENGINEER DAVID C. WALLER — DocuSigned by: David C. Waller 7/6/2015

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 34364 ENGINEER TRENTON J. CORMIER — DocuSigned by: Trent Cormier 7/6/2015

-L- OLD BEATTY FORD ROAD



PIPE HYDRAULIC DATA
18" RCP-IV STA 40+93 -L-

DRAINAGE AREA	= 0.37	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 1	CFS
DESIGN HW ELEVATION	= 749.18	FT
100 YEAR DISCHARGE	= 2	CFS
100 YEAR HW ELEVATION	= 749.23	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 13	CFS
OVERTOPPING ELEVATION	= 751.79	FT

INV IN = 748.50 INV OUT = 746.50

PIPE HYDRAULIC DATA
18" RCP-III STA 43+60 -L-

DRAINAGE AREA	= 1.47	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 6	CFS
DESIGN HW ELEVATION	= 742.77	FT
100 YEAR DISCHARGE	= 6	CFS
100 YEAR HW ELEVATION	= 742.77	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 28	CFS
OVERTOPPING ELEVATION	= 750.54	FT

INV IN = 741.35 INV OUT = 739.00

-L- OLD BEATTY FORD ROAD

STRUCTURE HYDRAULIC DATA

DRAINAGE AREA	= 5.9	SQ MI
DESIGN DISCHARGE	= 2400	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 655.4	FT
BASE DISCHARGE	= 2800	CFS
BASE HW ELEVATION	= 665.84	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 110000	CFS
OVERTOPPING ELEVATION	= 696.6	FT
BASE WATERWAY OPENING (EX)	= N/A	SF
BASE WATERWAY OPENING (PR)	= 930	SF

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PROJECT REFERENCE NO.	SHEET NO.
W-5516	17

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PIPE HYDRAULIC DATA
18" RCP-III STA 79+34 -L-

DRAINAGE AREA	= 1.67	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 7	CFS
DESIGN HW ELEVATION	= 760.07	FT
100 YEAR DISCHARGE	= 7	CFS
100 YEAR HW ELEVATION	= 760.07	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 25	CFS
OVERTOPPING ELEVATION	= 770.18	FT

INV IN = 758.54 INV OUT = 757.90

PIPE HYDRAULIC DATA
18" RCP-IV STA 83+33 -L-

DRAINAGE AREA	= 0.60	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 2	CFS
DESIGN HW ELEVATION	= 778.78	FT
100 YEAR DISCHARGE	= 3	CFS
100 YEAR HW ELEVATION	= 778.86	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 17	CFS
OVERTOPPING ELEVATION	= 782.44	FT

INV IN = 778.00 INV OUT = 773.80

PIPE HYDRAULIC DATA
24" RCP-III STA 86+44 -L-

DRAINAGE AREA	= 3.58	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 14	CFS
DESIGN HW ELEVATION	= 772.72	FT
100 YEAR DISCHARGE	= 15	CFS
100 YEAR HW ELEVATION	= 772.81	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 64	CFS
OVERTOPPING ELEVATION	= 786.28	FT

INV IN = 770.75 INV OUT = 762.43

PIPE HYDRAULIC DATA
30" RCP-IV STA 89+50 -L-

DRAINAGE AREA	= 7.74	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 25	CFS
DESIGN HW ELEVATION	= 768.49	FT
100 YEAR DISCHARGE	= 27	CFS
100 YEAR HW ELEVATION	= 768.63	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 112	CFS
OVERTOPPING ELEVATION	= 784.83	FT

INV IN = 766.00 INV OUT = 760.20

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-L- OLD BEATTY FORD ROAD

PIPE HYDRAULIC DATA
18" RCP-III STA 96+40 -L-

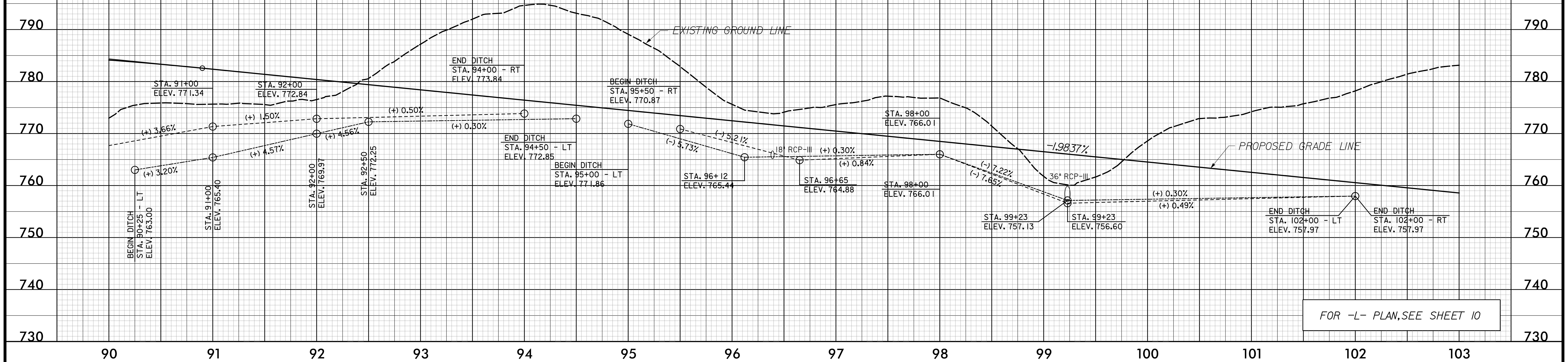
DRAINAGE AREA	= 1.55	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 5	CFS
DESIGN HW ELEVATION	= 766.70	FT
100 YEAR DISCHARGE	= 5	CFS
100 YEAR HW ELEVATION	= 766.70	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 21	CFS
OVERTOPPING ELEVATION	= 774.44	FT

INV IN = 765.44 INV OUT = 764.88

PIPE HYDRAULIC DATA
36" RCP-III STA 99+23 -L-

DRAINAGE AREA	= 10.52	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 34	CFS
DESIGN HW ELEVATION	= 760.05	FT
100 YEAR DISCHARGE	= 36	CFS
100 YEAR HW ELEVATION	= 760.16	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 100	CFS
OVERTOPPING ELEVATION	= 766.05	FT

INV IN = 757.13 INV OUT = 756.60



-L- OLD BEATTY FORD ROAD

CULVERT HYDRAULIC DATA

DRAINAGE AREA	= 0.3	SQ MI
DESIGN DISCHARGE	= 500	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 734.7	FT
BASE DISCHARGE	= 600	CFS
BASE HW ELEVATION	= 744.43	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 1400	CFS
OVERTOPPING ELEVATION	= 752.6	FT

PIPE HYDRAULIC DATA
72" RCP-III STA 108+55.3 -L-

DRAINAGE AREA	= 0.3	SQMI
DESIGN FREQUENCY	= 500	YRS
DESIGN DISCHARGE	= 50	CFS
DESIGN HW ELEVATION	= 734.7	FT
100 YEAR DISCHARGE	= 600	CFS
100 YEAR HW ELEVATION	= 744.43	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 1400	CFS
OVERTOPPING ELEVATION	= 752.6	FT

INV IN = 737.76 INV OUT = 735.64

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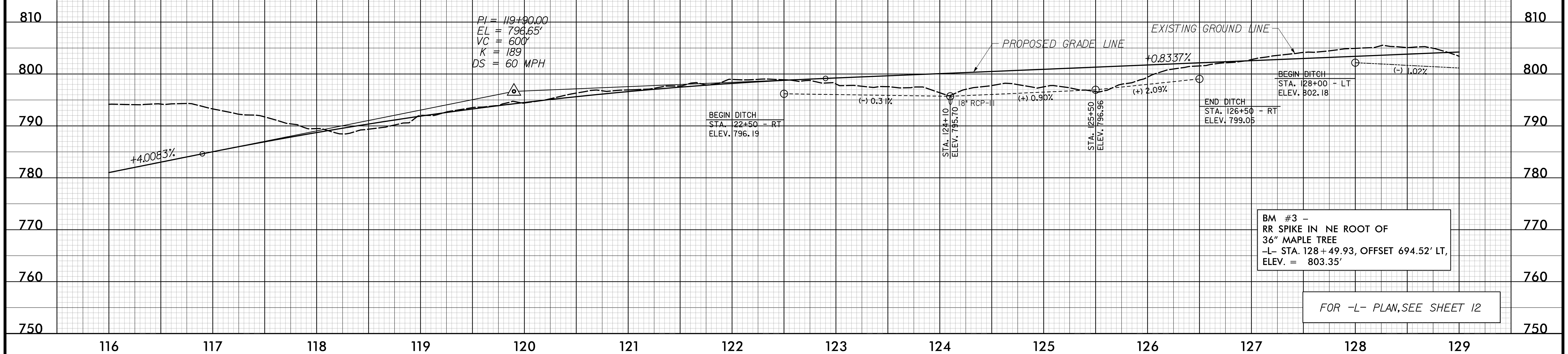
-L- OLD BEATTY FORD ROAD



PIPE HYDRAULIC DATA
18" RCP-III STA 124+10 -L-

DRAINAGE AREA	= 1.86	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 7	CFS
DESIGN HW ELEVATION	= 797.20	FT
100 YEAR DISCHARGE	= 8	CFS
100 YEAR HW ELEVATION	= 797.35	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 17	CFS
OVERTOPPING ELEVATION	= 800.15	FT

INV IN = 795.70 INV OUT = 792.65

BM #3 -
RR SPIKE IN NE ROOT OF
36" MAPLE TREE
-L- STA. 128+49.93, OFFSET 694.52' LT,
ELEV. = 803.35'

FOR -L- PLAN, SEE SHEET 12

-L- OLD BEATTY FORD ROAD

PIPE HYDRAULIC DATA
24" RCP-IV STA 129+62 -L-

DRAINAGE AREA	= 4.10	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 13	CFS
DESIGN HW ELEVATION	= 802.39	FT
100 YEAR DISCHARGE	= 14	CFS
100 YEAR HW ELEVATION	= 802.47	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 34	CFS
OVERTOPPING ELEVATION	= 805.53	FT

INV IN = 800.50 INV OUT = 798.50

PIPE HYDRAULIC DATA
18" RCP-IV STA 137+58 -L-

DRAINAGE AREA	= 1.74	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 6	CFS
DESIGN HW ELEVATION	= 808.12	FT
100 YEAR DISCHARGE	= 6	CFS
100 YEAR HW ELEVATION	= 808.12	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 16	CFS
OVERTOPPING ELEVATION	= 812.10	FT

INV IN = 806.68 INV OUT = 806.30

UNDERCUT EXCAVATION
RIGHT DITCH
LEFT DITCH

FOR -L- PLAN, SEE SHEET 13

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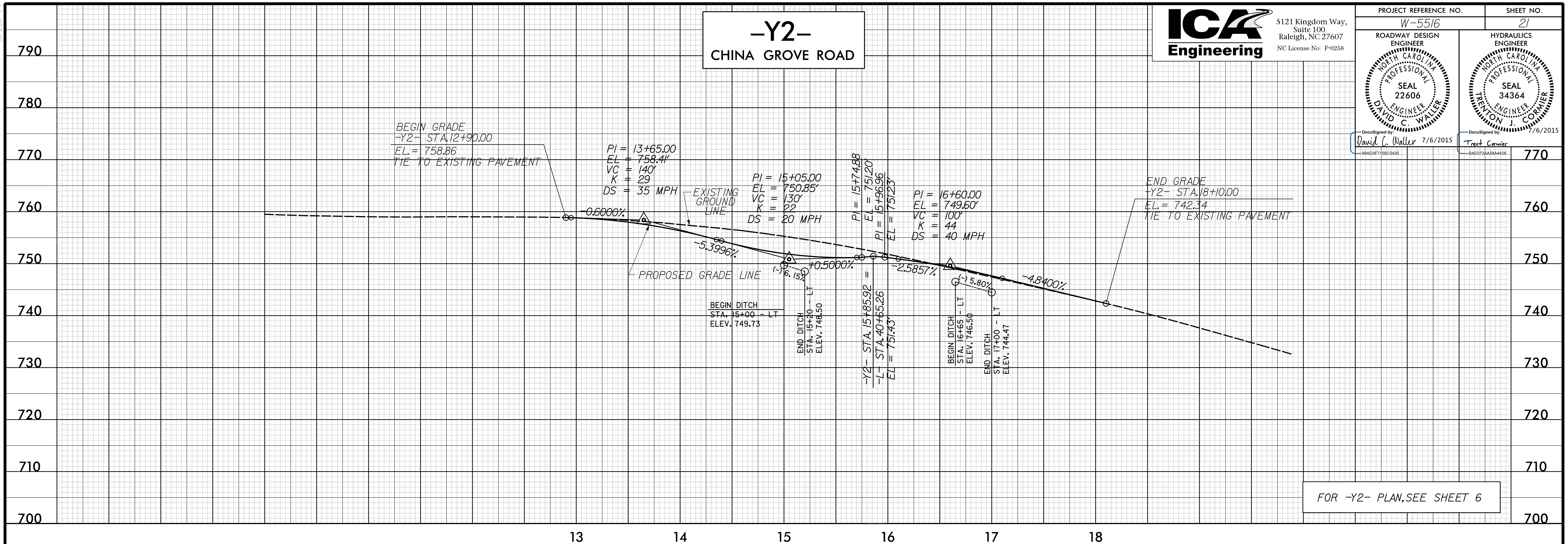

PIPE HYDRAULIC DATA

18" RCP-IV STA 14+00 -Y3-

DRAINAGE AREA	= 1.4	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 5	CFS
DESIGN HW ELEVATION	= 807.25	FT
100 YEAR DISCHARGE	= 5	CFS
100 YEAR HW ELEVATION	= 807.31	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 16	CFS
OVERTOPPING ELEVATION	= 811.04	FT

INV IN = 806.00 INV OUT = 805.70

PIPE HYDRAULIC DATA

18" RCP-IV STA 20+01 -Y3-

DRAINAGE AREA	= 1.45	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 5	CFS
DESIGN HW ELEVATION	= 806.29	FT
100 YEAR DISCHARGE	= 5	CFS
100 YEAR HW ELEVATION	= 806.36	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 28	CFS
OVERTOPPING ELEVATION	= 809.02	FT

INV IN = 805.70 INV OUT = 803.90

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